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Jones Falls Sewershed Evaluation Study Plan
Project 994

Model Development and Calibration Report

Sanitary Sewer Overflow Consent Decree
Civil Action No. JFM-02-1524

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Table of Contents

List of Tables

List of Figures

List of Appendixes

List of Attachments on CD

EXECUTIVE SUMMARY

As part of Baltimore City Project No. 994, Rummel, Klepper and Kahl, LLP and KCI Technologies, Inc. has developed a hydraulic model of the Jones Falls sewershed within the City of Baltimore. This model has been calibrated for both dry-weather and wet-weather utilizing data from 78 flow-monitoring sites and 20 rain gauge stations. This report outlines the development of the hydraulic model and the calibration of this model. This model meets the requirements of the Consent Decree (CD) agreed upon between the City, the United States Environmental Protection Agency and the Maryland Department of the Environment.

The flow-monitoring period extended from May 9, 2006 to May 18, 2007. Twenty-two of the meters have stayed in place. In addition to the 20 rain gauges, rainfall data has also been obtained from a Doppler Radar Rainfall Analysis. The flow meters used are area-velocity flow meters designed to measure flow in sanitary sewer pipes under free-flow and surcharged conditions. All 78 flow meters have been analyzed using the Sliicer.com software. Output from the Sliicer.com software include: weekday and weekend diurnal peaking factors; wastewater production rates; base infiltration; capture coefficients; and initial loss values.

The modeling software selected for this project is InfoWorks CS, by Wallingford Software, Ltd. As of the date of this report, the most recent version is InfoWorks CS 9.0. As required by the CD, the hydraulic model includes all force mains, major gravity lines, and related appurtenances. The model also includes all manholes, junctions, and structures along model sewer lines and all control structures existing in the system.
The City's wastewater geodatabase was used as the primary source of information for creating and populating the pipes and nodes network of the InfoWorks hydraulic model. Manhole inspection data, CCTV information, surveys of manhole rim elevations along with City engineering documents, were utilized to make numerous editing changes and enhancements to the City's wastewater GIS. The GIS data for the hydraulic model was then exported into the InfoWorks software. The hydraulic model was checked within InfoWorks for errors, connectivity or other discrepancies.

The Jones Falls sewershed has been divided into sewershed service areas (SSAs). These SSAs have been incorporated into the InfoWorks model as subcatchments. In some cases, the SSAs have been divided into multiple subcatchments.

Sources of data used in determining the dry-weather flows include: rainfall/flow monitoring data; the City's database of water consumption records; population estimates; estimates of tributary collection system to each flow monitor; and estimates of the tributary sewershed area to each flow monitor. The flow analyses obtained using the Sliicer.com software provides estimates of the components of the dry-weather flow; the average base flow (BSF) and the groundwater infiltration (GWI) rate at each flow monitoring site. The BSF is then estimated as the dry weather flow rate less the GWI estimate. In cases where negative GWI was a problem, the GWI has been estimated as a percentage of the BSF. These values were validated prior to input to the InfoWorks model.

The Sliicer.com analyses yields average daily dry weather flow hydrographs for each monitoring basin for both weekdays and weekends. This data was then used to develop hourly diurnal peaking factors for weekdays and weekends. This was done by first subtracting the GWI from the hourly values of the dry weather flow hydrographs and then dividing by the average BSF.

The approach to simulate wet weather flow uses the SWMM RUNOFF routines in InfoWorks CS as a synthetic storm hydrograph generator. Simulating rainfall-dependent infiltration and inflow (RDII) using SWMM RUNOFF within InfoWorks requires the specification of catchment characteristics that result in correct RDII. The parameters specified are: area; R-value; depression storage; width; slope; and overland flow routing coefficient.

The RDII volume versus rainfall depth plot for each monitoring site has been developed using the Sliicer.com software. In addition, Sliicer.com also develops the best-fit linear regression to the data set and the corresponding equation for the regression line, as well as the R-Value. Twenty nine storms have been considered in the analyses.

After the network of the model has been developed and flows inputted, the next step of the development process is calibrating the model. This consists of changing characteristics of the network and subcatchments to accurately portray what is happening in the real world. The first step is dry weather calibration. This is the process of modifying the network to reflect what is actually happening in the sewer system during a normal dry day. Following dry weather calibration, the second step is wet weather calibration. This is the process of adjusting subcatchments parameters to behave as they do in the real world.

The dry weather calibration begins with incorporating significant defects identified during the CCTV inspection. Sediment depths, blockages, and other flow restrictions are identified and then incorporated into the model. Based on the type of defect identified, Manning's "n" is changed to reflect increased roughness. "Observed vs. Predicted" plots are generated at the flow monitoring sites to see how the model behaves compared to the flow meter data. Any sites that require modification to meet flow depth, volume of flow, and velocity were adjusted to match the flow meter.

All of the meters in the Jones Falls generally meet the established in the BaSES Manual requirements for 75 of the 78 flow meters. The shape and timing of the hydrographs are compared to the observed and any major discrepancies were corrected by adjusting the diurnal curves. Depths and velocities were compared and the roughness factors and sediment depths (corresponding to field work investigations) were adjusted to match the observed. The model simulations time period for the dry weather calibration was run for one week and the volumes of the predicted vs. observed are totaled by InfoWorks for the time period. The curves were visually inspected to ensure all peak flow rates generally matched. All of the meters meet the requirements of BaSES manual.

Following completion of the dry weather calibration, wet weather calibration was initiated. After reviewing the results and looking at all of the 26 storm events, different criteria were adjusted to more accurately predict the flow meter responses. When looking at the metered vs modeled results, it appears that the model may not be sufficiently calibrated due to the behavior differences of summer and winter storms. Summer storms typically are of shorter duration and higher intensity than winter events. In addition, the ground is dryer and the water table is lower than compared to winter. This leads to less runoff per rain volume than compared to winter storms. With the ground wetter and the water table higher, more runoff occurs per same rain amount for winter storms than the summer storms. More than twice the amount of rain enters the sewers during the winter as compared to the summer. This led to difficulties in calibrating the model to accurately predict both type of storm events. A median R value was used in the model as a compromise. By using this method, the model over-predicts summer storms, but under-predicts winter storms. However, the calibration guidelines are generally met.

To assess the validity of the model, a series of graphs (statistical comparison plots) were produced as outlined in BaSES. Ideally a regression line with an R^2-value close to 1.00 indicates the goodness-of-fit between the modeled and observed peak flows and volumes, and an intercept of the regression line close to zero indicates that the modeled event volumes and peak flow rates are not biased (i.e., consistently over-predicting or under-predicting) with respect to the monitored volumes and peak flow rates. However, when using the median "R" value as discussed above, regression lines tend to vary from those parameters. The summer type storms have less I/I per rain depth than the winter storms. This skews the graph away from the ideal situation. The design storms to be used in the capacity analysis are more typical of the summer type storms rather than the winter type storms. With the Jones Falls model calibrated to a middle range, this provides a conservative capacity estimate, while not over-designing alternatives. In addition, the observed Vs. predicted graphs generated by InfoWorks were reviewed to assess the shape and timing of the hydrographs.

The hydraulic model of the Jones Falls Sewershed has been built in accordance with the Consent Decree and as outlined in the BaSES manual. The network was built from field verified GIS information and the flow inputs are based on 78 individual flow meters installed for over one year. Dry weather calibration was completed without having to use any unrealistic conditions. The wet weather calibration had to use a median "R" value to capture the differences between winter and summer storm events. However, when looking at all of the 26 modeled storms as a whole and balancing the differences, the model behaves in a realistic fashion. Based on these facts and the provided supporting material, the Jones Falls hydraulic model has been deemed "calibrated"; therefore the baseline and future flows capacity assessment can begin.

1.0 PROJECT DESCRIPTION

1.1 Project Location

The Jones Falls Sewershed encompasses approximately 16.5 square miles within the City of Baltimore, as depicted on Figure 1. Sewage from Baltimore County flows into the City's Jones Falls sewershed at five locations. The sewershed population within the City is approximately 144,000 and is highly developed. The Jones Falls Sewershed within the City of Baltimore includes over 350,000 linear feet of gravity sewers for pipe sizes greater than 10 inches in diameter.

1.2 Sub-Sewersheds

The Jones Falls Sewershed consists of a total of nine sub-sewersheds. These are listed in Table 1 below:

TABLE 1
SUB-SEWERSHEDS WITHIN THE JONES FALLS SEWERSHED

Upper Jones Falls	Barclay Street
Lower Jones Falls	Greenmount Avenue
Western Run	Bolton Hill
Stony Run	Maryland Avenue
Hampton Avenue	

The boundaries for each of the sub-sewersheds are depicted on Figure 1.

1.3 Consent Decree Requirements

A Consent Decree was agreed upon between the City of Baltimore, the United States Environmental Protection Agency and the Maryland Department of the Environment in April, 2002. One of the elements required by this Consent Decree is the development of a hydraulic model of the entire sewer system in the City, including the Jones Falls sewershed. The requirement of this hydraulic model is detailed in Paragraph 12 of the Consent Decree and is discussed more fully in Section 3.1 of this report. The purpose of this model is to evaluate the capacity of the existing sewer system and the impact of proposed improvements to the system. The Consent Decree also requires that an evaluation of infiltration and inflow (I/I) into the Jones Falls system.

1.4 Purpose and Scope

This report details the development and calibration of the hydraulic model of the Jones Falls Sewershed within the City of Baltimore. The calibration includes both dry-weather and wet-weather calibration.

2.0 FLOW MONITORING

2.1 Flow Monitoring Program

To fully understand the dynamics of the sewage collection system, the City completed a detailed City-wide monitoring program. The program consisted of flow meters within the City's collection system and rain gauges spread throughout the City and County. The monitors measured depth and velocity, from which flow was calculated at five minute intervals. The monitoring program consisted of over 350 flow monitors City-wide, with 78 of the meters located within the Jones Falls sewershed from May 9, 2006 to May 18, 2007. Some meters deemed long term meters have stayed in place. See Table 2 for a list of meters, their sub-basin, purpose, and installation history and Figure 2 for a location map of the meters and rain gauges. Figure 3 depicts a schematic of the monitoring plan. In addition to the flow monitors, 20 rain gauges were installed City-wide with some gauges installed outside of the City limits. All 20 rain gauges were utilized in conjunction with the generated radar rainfall for analysis.

2.2 Flow Monitoring and Rain Gauge Sites

The 78 flow-monitoring sites within the Jones Falls were selected depending on the use of the flow data. The majority of the sites, 62, were installed for infiltration and inflow (I&I) evaluation; whereas, 16 of the sites were installed for the calibration of the hydraulic model. See Table 2 at the end of this section for a list of the meters and their primary purpose. Using the City's Geographical Information System (GIS) the metering sites for I&I evaluation were selected at a meter density of approximately one for every 25,000 linear feet of sewer pipe. The meters used are area-velocity meters designed to calculate flow based on measured depths and velocities in sanitary sewer pipes under free-flow and surcharged conditions. The primary depth sensor is ultrasonic with a resolution to the nearest 0.01 foot. The meters have level measurement redundancy, in the form of a pressure sensor, with accuracy of +/- .25percent of full scale. The project required that the primary velocity sensor use Doppler technology, capable of measuring flow velocities in the range between -5 to +15 feet per second. The sensors were securely attached to the pipe by means of metal bands or anchoring hardware designed specifically for that purpose.

To measure the rainfall, a network of 20 rain gauge stations with a minimum coverage of one (1) rain gauge station per ten (10) square miles was installed and data compiled by Doppler radar to generate a minimum resolution of one (1) pixel per one (1) square kilometer. To measure the contribution from rainfall occurring in portions of the Collection System outside Baltimore City limits, additional rain gauges were installed outside the City limits. The rain gauge equipment was calibrated prior to installation. The equipment consisted of a data logger able to accept data from an industry standard rain tipping bucket. The equipment was able to measure 0.01 inches (or 1mm) per tip of bucket. The tipping bucket consisted of a corrosion resistant funnel collector with tipping bucket assembly.

2.3 CALAMAR Rain Data

In accordance with the requirements of the Consent Decree, the City performed Doppler Radar Rainfall Analysis in conjunction with rain gauges at a resolution of 1 gauge for every 10 square miles. The Contractor utilized the CALAMAR software platform to process each recorded rainfall event with an average total depth of greater than 0.5 inches of rain. CALAMAR is a tool used to study the hydrologic impacts of precipitation through a combination of radar images and a network of rain gauges installed over a geographic area. CALAMAR uses three databases: a radar image database, a rain gauge database and a geographical database. After collecting the rain gauge network data and the radar images, CALAMAR produces a model that provides geographically accurate, integrated rainfall intensity data for any pre-defined area. The Baltimore City geographical area was divided into 1 square kilometer pixels, and for every significant rain event Doppler Radar rainfall images were generated for every pixel within the Back River and Patapsco WWTP service areas. The output from the CALAMAR data is a file with a .RED extension that is directly imported into InfoWorks. While 39 rain events were provided, only a total of 26 storms were during the primary flow monitoring period. The dates of those storm events are in Table 3 below:

TABLE 3 STORMS USED FOR WET-WEATHER CALIBRATION			
Date	Depth (in)	Peak Intensity (in/hr)	Duration (hr)
May 11, 2006	1.678	2.193	8
June 1, 2006	0.179	0.524	2
June 2, 2006	1.732	3.031	4
June 19, 2006	0.554	3.504	5
June 25, 2006	5.238	4.484	39
July 5, 2006	2.311	1.988	12
July 22, 2006	1.276	4.717	9
August 7, 2006	0.78	2.803	2
September 1, 2006	1.935	0.343	26
September 5, 2006	1.629	1.417	8
September 14, 2006	1.638	0.547	38
September 28, 2006	1.015	2.319	7
October 5, 2006	1.728	0.386	44
October 17, 2006	1.136	0.378	9
October 27, 2006	1.634	0.488	30
November 7, 2006	1.472	0.594	15
November 16, 2006	2.244	2.161	9
November 22, 2006	0.551	0.161	11
December 22, 2006	0.938	0.232	15
January 1, 2007	0.843	0.547	12
January 7, 2007	0.833	0.287	17
March 1, 2007	0.922	0.5	15
March 15, 2007	1.996	0.74	26
April 4, 2007	0.302	0.858	5
April 11, 2007	0.622	0.417	17
April 14, 2007	2.664	0.961	31

It should be noted that some of the longer multi-day rain events were separated into separate storms events in the provided CALAMAR data to facilitate the file size limitations of InfoWorks, resulting in more CALAMAR rain events files than actual rain events.

2.4 Sliicer.com Analysis

All 78 flow meters were analyzed using the Sliicer.com.com software as required. The outputs of the analysis were: weekday and weekend diurnal peaking factors; wastewater production rates; base infiltration; capture coefficients; and initial loss values. The peaking factors and flow rates were directly inputted into the hydraulic model. The capture coefficients and initial loss values were used as starting off points to begin the wet weather calibration and were modified as required to complete the calibration process.

The Sliicer.com analysis began with setting the global parameters as required by the City. Next the dry day traces for each meter were edited to remove any outliers that may have passed through the filtering requirements (±15percent of average dry day, no rain within 1, 3, or 5 days depending on the volume). The diurnal curves were then exported to Excel to develop peaking factors. The base infiltration was subtracted from the exported flow volumes, and then that number was divided by the average wastewater production to obtain the hourly peaking factors. To complete the storm analysis in Sliicer.com, all of the storms were reviewed. The precompensation amounts were modified as necessary and the outliers and storm events that occurred when the meter may have been out of service were removed. The slope (S) of the regression line on the Q vs. I plot was used in the equation $R = (S_{in/mgd}*38.85_{mgd\text{-}acre/in})/Area_{acres}$ to obtain the capture coefficient (R). The initial loss value was obtained from where the best fit line crossed the X axis or set to zero if the line had to be forced through the origin. See Attachment 3 (PDF on attached CD) for time RDII versus rainfall depth for each storm event along with the associated regression line fit to the data set.

The primary installation intent of flow meters JFWRR01, JFWR01, JFINL, JFPS, JFS5, and JFOUT, which were all installed along the trunk sewers, was to assist in model calibration. However, there is a substantial amount of flow entering the conveyance system between the other upstream meters and these trunk meters. To develop wet weather parameters for input into the model for the unmonitored areas, those trunk meters were also analyzed in Sliicer.com.

TABLE 2 FLOW METER INSTALLATION HISTORY				
FLOW METER	**SUB-BASIN**	**INSTALLATION PURPOSE**	**INSTALL DATE**	**REMOVAL DATE**
JF01	Greenmount	I/I	5/9/2006	5/18/2007
JF02	Greenmount	I/I	5/9/2006	Long Term Meter
JF03	Greenmount	I/I	5/9/2006	Long Term Meter
JF04	Greenmount	I/I	5/9/2006	5/18/2007
JF05	Greenmount	I/I	5/9/2006	Long Term Meter
JF06	Greenmount	I/I	5/9/2006	5/18/2007
JF07	Maryland	I/I	5/9/2006	Long Term Meter
JF08	Maryland	I/I	5/9/2006	5/18/2007
JF09	Barclay	I/I	5/9/2006	Long Term Meter
JF10	Barclay	I/I	5/9/2006	5/18/2007
JF11	Bolton Hill	I/I	5/9/2006	Long Term Meter
JF12	Bolton Hill	I/I	5/9/2006	5/18/2007
JF13	Bolton Hill	I/I	5/9/2006	5/18/2007
JF14	Bolton Hill	I/I	5/9/2006	5/18/2007
JF15	Bolton Hill	I/I	5/9/2006	5/18/2007
JF16	Hampden	I/I	5/9/2006	5/18/2007
JF17	Hampden	I/I	5/9/2006	Long Term Meter
JF18	Hampden	I/I	5/9/2006	5/18/2007
JF19	Hampden	I/I	5/9/2006	5/18/2007
JF20	Hampden	I/I	5/9/2006	5/18/2007
JF21	Stony Run	I/I	5/9/2006	5/18/2007
JF22	Stony Run	I/I	5/9/2006	5/18/2007
JF23	Stony Run	I/I	5/9/2006	5/18/2007
JF24	Stony Run	I/I	5/9/2006	5/18/2007
JF25	Stony Run	I/I	5/9/2006	Long Term Meter
JF26	Stony Run	I/I	5/9/2006	5/18/2007
JF27	Stony Run	I/I	5/9/2006	Long Term Meter
JF28	Stony Run	I/I	5/9/2006	5/18/2007
JF29	Stony Run	I/I	5/9/2006	Long Term Meter
JF30	Stony Run	I/I	5/9/2006	Long Term Meter
JF31	Stony Run	I/I	5/9/2006	5/18/2007
BJF2	Stony Run	Calibration	5/9/2006	5/18/2007
BJF3	Stony Run	Calibration	5/9/2006	5/18/2007
JF32	Lower Jones Falls	I/I	5/9/2006	5/18/2007

TABLE 2 FLOW METER INSTALLATION HISTORY				
FLOW METER	**SUB-BASIN**	**INSTALLATION PURPOSE**	**INSTALL DATE**	**REMOVAL DATE**
JF33	Lower Jones Falls	I/I	5/9/2006	5/18/2007
JF34	Lower Jones Falls	I/I	5/9/2006	5/18/2007
JFOUT	Lower Jones Falls	Calibration	5/9/2006	5/18/2007
JFS5	Lower Jones Falls	Calibration	5/9/2006	Long Term Meter
TSJF02A	Lower Jones Falls	Calibration	5/9/2006	Long Term Meter
TJSF02B	Lower Jones Falls	Calibration	5/9/2006	5/18/2007
JFZOO	Lower Jones Falls	I/I	5/9/2006	5/18/2007
JF35	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF36	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF37	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF38	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF39	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF40	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF41	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF42	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF43	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF44	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF45	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF46	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JF47	Upper Jones Falls	I/I	5/9/2006	5/18/2007
JFL	Upper Jones Falls	Calibration	5/9/2006	Long Term Meter
JFOF	Upper Jones Falls	Calibration	5/9/2006	Long Term Meter
JFPS	Upper Jones Falls	Calibration	5/9/2006	Long Term Meter
JFINL	Upper Jones Falls	Calibration	5/9/2006	Long Term Meter
TSJF01	Upper Jones Falls	Calibration	5/9/2006	Long Term Meter
JFWR01	Western Run	Calibration	5/9/2006	Long Term Meter
JFWRR01	Western Run	Calibration	5/9/2006	Long Term Meter
JFWR07	Western Run	I/I	5/9/2006	5/18/2007
JFWR09	Western Run	I/I	5/9/2006	5/18/2007
JFWR11	Western Run	I/I	5/9/2006	5/18/2007
JFWR12	Western Run	I/I	5/9/2006	5/18/2007
JFWR14	Western Run	I/I	5/9/2006	5/18/2007
JFWR15	Western Run	Calibration	5/9/2006	Long Term Meter
JFWR17	Western Run	I/I	5/9/2006	5/18/2007
JFWR18	Western Run	I/I	5/9/2006	5/18/2007

TABLE 2 FLOW METER INSTALLATION HISTORY				
FLOW METER	**SUB-BASIN**	**INSTALLATION PURPOSE**	**INSTALL DATE**	**REMOVAL DATE**
JFWR18	Western Run	I/I	5/9/2006	5/18/2007
JFWR19	Western Run	I/I	5/9/2006	5/18/2007
JFWR22	Western Run	I/I	5/9/2006	5/18/2007
JFWR24	Western Run	I/I	5/9/2006	5/18/2007
JFWR29	Western Run	I/I	5/9/2006	5/18/2007
JFWR31	Western Run	Calibration	5/9/2006	Long Term Meter
JFWR33	Western Run	I/I	5/9/2006	5/18/2007
JFWR34	Western Run	I/I	5/9/2006	5/18/2007
JFWR35	Western Run	I/I	5/9/2006	5/18/2007
JF03_20S	Western Run	Calibration	5/9/2006	5/18/2007

3.0 MODEL DEVELOPMENT

3.1 General

As stated in Paragraph 12 of the Consent Decree, a model is required to be developed for each sewershed within the City. The model must be capable of evaluating the impact of I/I rehabilitation projects, proposed system modifications, upgrades, and expansions to the transmission capacity and performance of the Collection System. The model is required to be capable of predicting:

1. The volume of wastewater flow in the force mains and major gravity lines
2. Hydraulic pressure or hydraulic grade line of wastewater at any point in force mains and the major gravity lines
3. Flow capacity of each of the pumping stations in the collection system
4. Flow capacity of each pumping station with its back-up pump out of service
5. Peak flows for each pumping station during storm events of a magnitude of up to 20 years
6. Likelihood and location of overflows under high flow conditions, including pumping station service areas where the pumping station's back-up pump is out-of-service, and considering available wet well capacity, off-line storage capacity, and normal in-line storage capacity.

The model must also be:

1. Configured based on representative, accurate, and verified system attribute data (i.e., pipe sizes and invert elevations, manhole rim elevations, etc.)
2. Calibrated using spatially and temporally representative rainfall data and flow data obtained during the rainfall and flow monitoring
3. Verified using spatially and temporally representative rainfall data and flow data; that data shall be independent of the data used to calibrate the model.

The model shall be certified that:

1. The model includes all elements listed above in this section
2. The model has been calibrated, including the performance of sensitivity analyses, and verified using actual flow data from metering points in the sewershed

3.2 Horizontal and Vertical Datums

The horizontal datum used for the hydraulic modeling is the Maryland State Plane Coordinate System (NAD83). The vertical datum used is NAVD88.

3.3 Modeling Software

3.3.1 InfoWorks CS

The modeling software selected for the City of Baltimore Collection System Evaluation and Sewershed Plan is InfoWorks CS, by Wallingford Software, Ltd. An evaluation team for the City selected this modeling software among others available as the best suited for the City of Baltimore system. As of the date of this report, the most recent version is InfoWorks CS 9.0.

3.3.2 Information Required

In order to run the hydraulic model for the Jones Falls sewershed, data to describe the sewer system is required. The data is required for pipes, manholes and other junctions, control structures, pumping stations, and other features. Table 4 at the end of this section lists all the data included in the Jones Falls hydraulic model.

3.4 Network Development

As stated in the Consent Decree, the modeled network shall include all force mains, major gravity lines, and pumping stations and their respective related appurtenances. Major gravity lines are defined in the Consent Decree as:

- all gravity lines ten inches in diameter or larger;
- all eight-inch lines that convey or are necessary to accurately represent flow attributable to a service area in each of the Collection System's sewershed service areas;
- all gravity lines that convey wastewater from one pumping station service area to another pumping station service area; and
- all gravity lines that have caused or contributed, or that the City knows are likely to cause or contribute, to capacity-related overflows (utilizing the Water In Cellar (WIC) database).

The model also includes all manholes, junctions, and structures along model sewer lines and all control structures (e.g. weirs and pumping stations) existing in the system.

3.4.1 GIS Development

The City's wastewater geodatabase was used as the primary source of information for creating and populating the pipes and nodes network of the InfoWorks hydraulic model. One of the first tasks was to establish the GIS features that would be part of the hydraulic model. To accomplish this task, a separate SEWER_INFO table was created which linked to the GIS's WW_Sewer feature class through the GLOBALOID field.

Within the SEWER_INFO table the HYD_CODE field was designed to signify the hydraulic modeling state of the sewer pipe. The HYD_CODE field contains the following values in Table 5:

TABLE 5
HYD_CODE DESCRIPTIONS

HYD_CODE	Description
2	In the model (manually added to the model)
1	In the model (based on size – greater or equal to 10-inches)
0	Not in the model (based on size - less than 10-inches)
-1	Not in the model (abandoned sewer)
-2	Not in the model (not in the Jones Falls sewershed)
-3	Not in the model (manually dropped from the model)

With the SEWER_INFO table built and joined with the WW_Sewer feature class, the HYD_CODE field was populated using the existing GIS data, as follows:

1. All sewers that fell out of the Jones Falls sewershed were flagged with a -2
2. Abandoned sewers (within or crossing the Jones Falls sewershed boundary) were flagged with a -1
3. Active Jones Falls sewers less that 10-inches were flagged with a 0
4. Active Jones Falls sewers greater or equal to 10-inches were flagged with a 1

With the table initialized, a special Oracle database insert trigger was established on the GIS WW_Sewer feature attribute table. This trigger would result in a new row being added to the SEWER_INFO table each time a new GIS WW_Sewer feature was created in the GIS. This new row would again, be linked to the new sewer feature through its GLOBALOID field. The trigger would also examine the sewer feature's attributes and set the HYD_CODE field of the associated SEWER_INFO record appropriately. A similar Oracle update trigger on the WW_Sewer table would result in an update to the HYD_CODE status based on the pipe size and feature status. This trigger would only change or set values to and from (-1, 0 and 1). The triggers would not set or change a HYD_CODE value of 2 or -3. These special values allow the status to be locked at either in or out of the model.

An ArcGIS project was created which symbolized sewer pipe features based on the HYD_CODE field's value. In this case, model sewers features (HYD_CODE>0) were displayed with a thick red line, and non-model sewer features (HYD_CODE<=0) displayed with a thin blue line. A simple utility was developed in ArcGIS to enable a user to easily add or remove sewer features from the hydraulic model by changing the feature's HYD_CODE status field. To drop a sewer from the hydraulic model, the utility would set the HYD_CODE field to -3, and to add to the model, HYD_CODE would be set to 2. Using ArcGIS, an

RK&K engineer panned and zoomed throughout the Jones Falls sewershed flagging sewers as necessary to establish proper hydraulic modeling connectivity.

RK&K utilized the manhole inspection and CCTV information from project field survey efforts, along with City engineering documents from the AIRS archive, to make numerous editing changes and enhancements to the City's wastewater GIS. These field datasets were invaluable in assisting in the population of a substantial amount of missing GIS feature attribute data in both model and non-model related features.

To maintain the connectivity of the hydraulic model sewers within the GIS, an Engineer or GIS Analyst periodically performed a visual review of the model sewers making changes to the HYD_CODE status as necessary.

3.4.2 Exporting the GIS Data to InfoWorks

The GIS data for the hydraulic model was exported from the GIS on a sub-sewershed basis to a personnel geodatabase (PGDB). This PGDB was then imported directly into InfoWorks software. A GIS Analyst followed these procedures in preparing the GIS for an export to the hydraulic model:

1. Select all hydraulic model features in the subsewershed.

2. Open the sewer feature attribute table to review the population of all key attributes (WIDTH, HEIGHT, SHAPE_CODE, IN_ELEV_SP and OUT_ELEV_SP). Any key attribute missing should be researched and populated.

3. Export the selected hydraulic model features to an empty PGDB.

4. Perform a spatial locate to select any nodal feature that is connected to a hydraulic model sewer feature. These nodal feature layers include:
    - WW_ManholeJunction
    - WW_Bend
    - WW_SewerEnd
    - WW_SewerInter
    - WW_Lamphole
    - WW_MeterStn
    - WW_PumpStn
    - WW_TreatmentPlant
    - WW_Valve

5. The selected point features were also exported to the same PGDB. The rim elevation from the WW_ManholeJunction feature accompanied the dataset. An artificial rim elevation for the other non-manhole feature was established in the InfoWorks software using the XYZ mass point DEM.

3.4.3 Manhole Inspection Data

Manhole inspections have been completed for the majority of the approximate 9,300 manholes in the Jones Falls sewershed. Data collected from the manhole inspections include: the number, size and location of the pipes entering and exiting the manhole; the depth from the manhole rim to the invert of the manhole, the depth of sediment in the connecting pipes, the general condition of the manholes, and other data. Data from the manhole inspections has been used to supplement, verify or correct data from the GIS and record drawings.

3.4.4 Record Drawings

Record drawings for the Jones Falls sewershed have been obtained from the City. These record drawings include all the available drawings listed in the AIRS database. Information from these drawings has been transferred into the GIS for the Jones Falls system. Data obtained from the record drawings include: pipe sizes, shapes and types; invert elevations; manhole locations; weir locations and sizes; flume locations and sizes; flap valve locations; and pumping station data including number of pumps and capacity.

3.4.5 Surveys

To populate the inverts of the hydraulic model sewers, RK&K used the GIS to establish the 1,961 manholes connected to hydraulic model sewers. Survey crews were dispatched to obtain survey-grade elevations on as many of these hydraulic model manholes as possible. To date, 938 survey-grade GPS location on model manholes have been quality reviewed and imported into the GIS. The remaining elevations were established through a document review process using AIRS documents and additional documents obtained at the City. There were a small percentage of approximately 40 model-related invert elevations that were not available from GPS or through document research. We were required to estimate these elevations using available information and sound engineering judgment. The RK&K team is continuing to capture survey-grade GPS points at selective model-related manholes and will update the GIS and the hydraulic model attributes as changes are made.

Manhole rim elevations were taken from available GPS surveys, or from the available ground elevation model developed from XYZ mass points.

To populate the elevation information in the GIS (rim and invert elevations), field inspection data was utilized where available as the primary source. When field inspection data was not available, information from as-builts was then utilized to populate the GIS.

3.4.6 Data Flagging and User Text Fields

All of the GIS information imported into InfoWorks was flagged corresponding to the capture method and elevation source populated in the GIS. Information that was not flagged that also came from GIS, was flagged as "GI". Information that had to be modified for modeling purposes had their flags updated to indicate the data source in making the change. The flags that came with the Macro Model were used when making the changes. Notes, if applicable, to why the change was required were added to the Notes and User Text columns in the model. In addition, other columns in the InfoWorks Grid view and User Text fields were populated to assist in model development, maintain relationships to GIS, and to determine the original data sources for the GIS information. A key to those fields is as follows:

Nodes:

Asset ID - GIS GLOBALOID, truncated to 32 characters
User Text 1 - GIS GLOBALOID
User Text 2 - GIS capture method
User Text 3 - GIS elevation data source
User Text 4 - Notes
User Text 5 - Notes

Conduits:

Asset ID - GIS GLOBALOID, truncated to 32 characters
Sewer Reference - Lining type
User Text 1 - GIS GLOBALOID
User Text 2 - GIS Pipe ID
User Text 3 - Notes
User Text 4 - Notes
User Text 5 - GIS capture method
InfoNet US Node ID – Upstream invert elevation data source
InfoNet DS Node ID – Downstream invert elevation data source

TABLE 6 GIS SOURCE CODESs & INFOWORKS DATA FLAGS			
GIS Code	**Description**	**InfoWorks Flag**	**Flag Description**
PLAT	Wastewater Plat Map	RI	Record Information
CD	Contract Drawing	RI	Record Information
CA	Contract As-Built Plan	RI	Record Information
FI	Field Investigation/Inspection	FS	Data From Field Survey
ORTH	Orthophoto Interpretation	RI	Record Information
GN	Geometric Network	RI	Record Information
GPS	GPS (Survey Grade)	FS	Data From Field Survey
SVY	Traditional Field Survey	FS	Data From Field Survey
EST	Interpolated from engineering documents/other sources	AS	Inferred or Assumed
CDP	Construction Design Plans (value shown on plans)	RI	Record Information
CAP	Construction As-Built Plans (value shown on plans)	RI	Record Information

3.4.7 QA/QC Procedures

The hydraulic model was checked within InfoWorks. InfoWorks checks the network for errors such as unconnected nodes, pipes that have adverse slopes, subcatchments that don't drain to a node, and other similar checks. In addition upstream and downstream checks were made to verify connectivity, long view sections were viewed to verify vertical correctness, and any discrepancies were compared to field and record drawing information to be corrected.

3.5 Model Basin Development

3.5.1 General

The InfoWorks CS model for the Jones Falls sewershed incorporates the hydrologic characteristics of the sewershed. The model utilizes the SWMM surface runoff routine within InfoWorks. The wet weather flow input to the sanitary sewer system must be represented differently. The SWMM surface runoff routine is used as a surrogate rainfall-dependent infiltration and inflow (RDII) simulator, meaning that although the parameters used in the runoff routines are adjusted to match the observed inflow, those parameters do not have physical significance. Hence, for wet weather flow simulation in separate sanitary sewers, the surface runoff routine of SWMM is being applied to empirically develop RDII flows in the InfoWorks model. This procedure has the advantage of allowing inflow simulation as a function of any rainfall depth and distribution, within the framework of the model rather than outside of it.

3.5.2 Sewershed Service Areas

The Jones Falls sewershed has been divided into sewershed service areas (SSAs). These SSAs have been incorporated into the InfoWorks model as subcatchments. Subcatchments have been delineated using the following guidelines:

- Sub-basin areas should be roughly 10-40 acres in size, with an average of approximately 20 acres with the exception of catchments at upstream boundaries, which may be larger.
- Subcatchment boundaries should generally be drawn at hydraulic control points such as:
  - Flow diversion chambers
  - Pumping stations
  - Any constructed overflow point
  - Significant tributary junctions
  - Flow monitor locations
- Large parcels of land such as parks, golf courses and freeways that are not connected to the collection system should be excluded from the subcatchments for the purposes of collection system modeling
- Subcatchment delineations should not cross over combined or sanitary pipes: they should always end at a manhole

For each subcatchment, a load point node is identified for the assignment of dry and wet weather flows into the hydraulic model network. Model load points should be assigned to best represent the affects of flows entering the system. Dry pipes, that do not receive flow from an upstream load point, have been avoided in the model.

The subcatchment ID in InfoWorks closely follows the corresponding SSA name. In instances where the subcatchment and the SSA are one and the same, the subcatchment ID matches the SSA name. In case where the SSA has been subdivided into multiple subcatchments, a one character suffix has been added.

3.6 Dry-Weather Flow Development

3.6.1 General

There are several sources of data used in the development of dry-weather flows in the InfoWorks model. These sources include:

- Analyses of the rainfall/flow monitoring data using the Sliicer.com software
- The City's database of water consumption records for each SSA
- Population estimates for each flow monitoring basin obtained through GIS intersection with the U.S. Census Block data
- GIS estimates of tributary collection system to each flow monitor in inch-diameter-miles
- GIS estimates of the tributary sewershed area to each flow monitor

3.6.2 Flow Analysis

The flow analyses obtained using the Sliicer.com software provides estimates of the components of the dry-weather flow; the average base sanitary flow (BSF) and the groundwater infiltration (GWI) rate at each flow monitoring site. It is important to note that these flow components are not measured directly, but instead are estimated based on certain assumptions. Typically, minimum sewer flows occur during the summer and during the night, between the hours of 2 and 4 AM. During these hours, it is assumed that most of the sewer flow is due to GWI. GWI is often assumed to comprise 88 to 90 percent of these nighttime flows. Sliicer.com has several methodologies for estimating BSF and GWI. For the purposes of developing flows for the model, the default methodology, the Stevens/Schutzbach equation was used. GWI = (0.4*Min Daily Flow)/(1-0.6(Min Daily Flow/Average Daily Flow)^Average Daily Flow^0.7). The BSF is then estimated as the dry weather flow rate less the GWI estimate. In cases where negative GWI was a problem, the GWI has been estimated as a percentage of the BSF.

These values were validated prior to input to the InfoWorks model. Validation of the BSFs for residential areas has been performed by dividing BSF by the population of the monitoring basin to determine the per capita wastewater generation rate. These results were then compared to typical textbook ranges of values for residential areas.

For basins which include industrial and commercial water users, the water consumption records, including the Top 100 City Water users database, were reviewed to determine average daily BSFs from these facilities and to validate the corresponding BSFs obtained through the Sliicer.com analyses. However no additional flow was needed to be entered into the model to capture unusual flow patterns.

Validation of the GWI estimates are not straightforward since GWI can vary widely based on the condition of the sewer and elevation of the groundwater table. Often to determine the relative rate of GWI, an estimate of the sewer tributary to the flow monitor is determined, in units of inch (diameter)-miles, and the GWI is then normalized by the inch (diameter)-miles estimate. Textbook values can be used to determine if the normalized GWI estimate is indicative of a tight or leaky sewer system. The amount of infiltration that can enter a sanitary system can range from 100 to 10,000 gallons per day per inch-mile of sewer.

The Sliicer.com analyses yields average daily dry weather flow hydrographs for each monitoring basin for both weekdays and weekends. This data was then used to develop hourly diurnal peaking factors for weekdays and weekends. This was done by first subtracting the GWI from the hourly values of the dry weather flow hydrographs and then dividing by the average BSF.

In the InfoWorks model, a profile in the wastewater group has been created for each monitoring basin. The wastewater profile contains weekday and weekend hourly diurnal peaking factors. In addition, a per capita wastewater generation rate must be specified in the wastewater profile. This generation rate, multiplied by the subcatchment population, yields the average BSF. The population for each sub-catchment was set to the BSF with a generation rate of 1 gpdpp.

GWI has been represented in the InfoWorks model as a "trade flow". The GWI component for a given monitoring basin was distributed to the tributary subcatchments based on relative sewershed area. The GWI is represented as a constant inflow, therefore, the hourly and monthly peaking factors in the trade waste profile are set to one. However, by representing GWI as a trade waste, the flexibility to vary GWI on a monthly or hourly basis, in order to account for the variation in GWI due to seasonality, is gained and may be incorporated into the model at such time when the rainfall and flow monitoring data set is more complete. Subsequently, each subcatchment comprising a monitoring basin will be assigned the appropriate trade waste profile.

3.7 Wet-Weather Flow Development

3.7.1 General

Analysis of the monitoring data also yields model input for the simulation of wet-weather events. The wet-weather flow component in sanitary sewers is referred to as rainfall-dependent infiltration and inflow (RDII).

3.7.2 SWMM Routine within InfoWorks CS

The approach proposed to simulate wet weather flow in areas served by separate storm sewers uses the SWMM RUNOFF routines in InfoWorks CS as a synthetic storm hydrograph generator. SWMM was originally intended to simulate urban runoff collection systems, i.e. drainage systems and combined sewer systems. The application of this model to separate sanitary sewer systems differs from the more conventional use of RUNOFF to simulate overland flow and related phenomena. In a sanitary system, the RDII is driven not by the impervious surface of the modeled catchment, but rather by a myriad of factors including:

- Age and condition of the system
- Construction practices at the time of installation
- Prevalence of direct (illicit) connections to the sanitary system
- Operation and maintenance of the system
- Antecedent moisture conditions (the saturation of the ground around the sewers)
- Groundwater elevation

To simulate inflow into sanitary sewer systems, suitable input parameters are selected to yield flow that matches inflows determined from flow meter measurements. These input parameters are therefore extensions of their normal definition. The following is a description of the steps used to develop initial parameter estimates for the inflow model.

Simulating RDII using SWMM RUNOFF within InfoWorks requires the specification of catchment characteristics that result in correct RDII. These catchment characteristics do not have physical significance. Rather, they allow simulation of RDII using runoff calculation formulations. The parameters to be specified are:

- Area: The total area of each subcatchment (in acres) is calculated in GIS.

- R-Value (Percent Capture): The SWMM RUNOFF routines simulate wet weather from a modeled basin via impervious and pervious runoff. Impervious runoff typically represents that portion of flow generated from paved surfaces (e.g., parking lots, roads, driveways) and from other impervious surfaces connected to the sewer system such as building roofs. For sanitary sewer systems, the percent impervious is analogous to a percent capture or more appropriate an RDII "R-Value". The R-Value represents the fraction of the rainfall that enters the sanitary system. Sliicer.com provides an estimate of the R-Value.

  The infiltration factors for pervious areas are adjusted such that there is no runoff (RDII) from pervious areas. The volume of RDII is proportional to the rainfall depth:

  $$V = CA(D-DS)$$

  Where:

  V = RDII volume, cubic feet
  C = R-Value (equivalent to percent capture)
  D = rainfall depth, feet
  DS = Depression storage, feet
  A = catchment area, square feet

  The value of C is determined by analysis of flow measurement data. After separating the rainfall-induced flow for a number of storms, RDII volumes can be calculated and plotted versus rainfall depth. C is proportional to the slope of the correlation line.

- Depression storage: Depression storage represents the volume, in inches, that must be filled prior to the occurrence of runoff. For surface runoff it represents the initial loss or "abstraction" caused by such phenomena as surface ponding, surface wetting, interception and evaporation. For the RDII modeling purposes, this parameter represents the depth of rainfall

required to initiate a response in the sewer system. In this case, depression storage has been estimated using the intercept of the RDII volume vs. rainfall (Q vs. i plot in Sliicer.com) regression line. Typical values for depression storage in RDII applications are in the range of 0.1 to 0.5 inches, and can vary greatly for the same area as a function of antecedent moisture conditions.

- Width: The subcatchment width is a key calibration parameter, one of the few that can significantly alter the hydrograph shape (timing of the peak flow rates) without impacting the volume. The width is determined when the simulated time-to-peak and magnitude match the observed peak RDII flow during several storms. This has been done by simulating the storm events using the model and adjusting the catchment width until the correct peak is obtained. Subcatchment width is directly proportional to peak flow rate. The value of the subcatchment width used in the model may be adjusted as necessary to best match the observed peak flows.

- Slope: For combined and stormwater (surface runoff) models, this value represents the physical slope of the ground surface. However, as stated previously, when the surface flow routine of SWMM RUNOFF is used to simulate RDII flows, the parameters are no longer physically based. An average basin slope can be calculated using GIS. This value can be modified to help adjust the modeled peak flows and volumes during model calibration, but it is not a sensitive parameter.

- Overland Flow Routing Coefficients: Manning's roughness values can be modified to fine tune predicted hydrograph responses. Experience has shown that a value for Manning's roughness coefficient for a subcatchment in a separate sanitary sewer ranges from 0.015 to 0.05.

3.7.3 Flow Analysis

The RDII volume versus rainfall depth plot (Q vs. i plot – Sliicer.com terminology) for each monitoring site, has been developed using the Sliicer.com software. In addition, Sliicer.com also develops the best-fit linear regression to the data set and the corresponding equation for the regression line, as well as the R-Value. Twenty-nine storms have been considered in the analyses. These storms are listed in Table 7 below.

TABLE 7
STORMS USED FOR DEVELOPMENT OF R-VALUES

5/11/2006	6/25/2006	9/14/2006	10/27/2006	12/25/2006	3/23/2007
5/14/2006	7/5/2006	9/28/2006	11/7/2006	12/31/2006	4/4/2007
6/2/2006	7/22/2006	10/5/2006	11/16/2006	1/7/2007	4/11/2007
6/19/2006	9/1/2006	10/17/2006	11/22/2006	3/1/2007	4/14/2007
6/24/2006	9/5/2006	10/19/2006	12/22/2006	3/15/2007	

3.8 Boundary Conditions

To accurately reflect the hydraulics of the sewershed, boundary conditions had to be setup within the model. There are six sources of inflow from Baltimore County and one outfall level condition that had to be included in the model. The inflows were all monitored by flow monitors BJF2, BJF3, TSJF01, JFWR15, JF03_20S, and JFWR31. Diurnal curves were developed for each of these gauges and there average flows inputted into the model. The boundary SSAs provided with the macro model was the source of information for the boundary SSAs in the micro model. Capture coefficient or "R" values were first estimated through Sliicer.com then fine-tuned through the calibration effort.

To determine the level condition at the outfall of the Jones Fall into the High Level Interceptor, the flows at HL09 were utilized. The flows from the entire monitoring period were exported from Sliicer.com then imported into a very simple hydraulic model within InfoWorks as an inflow event. The High Level Interceptor at the confluence with the Jones Falls is a 100-inch diameter sewer with a slope of 0.0412percent. According to the site report of HL08A, just downstream of the Jones Falls confluence, there is approximately 27inches of silt in the High Level Interceptor. All of the above parameters were inputted into the model to determine the level (backwater condition) at the Jones Falls outfall due to the incoming flow from the High Level. A level event was created from the results to be inputted into the complete micro model. See Figure 4, Boundary Conditions Location Map, for a map locating the boundary conditions.

TABLE 4 DATA INCLUDED IN JONES FALLS HYDRAULIC MODEL		
Category	Information Included	Notes
Manhole/ Nodes	Node ID	
	Node Type (Manhole, break, outfall, storage)	"Nodes" are included at every manhole, intersection of pipes, lampholes, outfall, etc. Break nodes have been modeled as manholes.
	X	
	Y	
	Ground Level	Ground levels are included for each node. Ground levels have either been obtained from survey data or interpolated based on a digital elevation model.
	Flood Level	Assumed to be same as ground level
	Chamber Floor Level	Estimated to be the same as the invert of the lowest connecting pipe.
	Chamber Plan Area	Computed within InfoWorks based on size of connecting pipes
	Chamber Roof Level	Assumed to be equal to the crown of the highest pipe.
	Shaft Plan Area	Computed within InfoWorks based on size of connecting pipes
	Flood Type	Flood depth assumed as same as rim elevation.
	Locations where sanitary cross-connects with the storm system	To be included after results of smoke and dye testing
Pipes	Upstream Node ID	
	Downstream Node ID	
	Length	Estimated from node XYs and/or GIS
	Shape ID	In cases where the pipe is not circular, information on the exact shape has been provided.
	Width	
	Height	If pipe is circular, the height by default equals the width.
	Roughness Type	Manning's roughness coefficients have been used. Value is generally based on material type. In the absence of pipe material data, a standard value of 0.013
	Bottom Roughness	
	Top Roughness	

TABLE 4 DATA INCLUDED IN JONES FALLS HYDRAULIC MODEL		
Category	Information Included	Notes
Pipes		has been used.
	Sediment Depth	Pipe sediment depths have been accounted for in the model, based on CCTV and manhole inspections. If unknown sediment is present, sediment depths have been estimated during model calibration.
	Upstream Invert Level	
	Downstream Invert Level	
	Pipe age/ /material/condition	Deterioration of the system in future conditions will be accounted for.
Flap Valves	Upstream Node ID	
	Downstream Node ID	
	Invert Level	
	Diameter	
Weir	Upstream Node ID	
	Downstream Node ID	
	Crest Level	
	Width	
	Height	
	Length	For broad-crested weirs only
	Notch Height	For V-notch weirs.
	Notch Angle	
	Notch Width	
	Number of Notches	
	RTC Parameters	If a weir is “variable” and requires RTC, then RTC information has been provided.
Flume	Upstream Node ID	
	Downstream Node ID	
	Invert Level	
	Throat Width	
	Throat Length	
	Side Slope	
Pump	Upstream Node ID	
	Downstream Node ID	
	Switch On Level	
	Switch Off Level	
	Delay	A default number has been used.
	Discharge (FixPmp	

TABLE 4 DATA INCLUDED IN JONES FALLS HYDRAULIC MODEL		
Category	Information Included	Notes
Pump	and VspPmp Only)	
	Head Discharge Curve	
	Wet well	Wet wells have been modeled as a storage node.
	RTC Parameters	If a pump is "variable" and requires RTC, then RTC information has been provided.
Screens	Upstream Node ID	
	Downstream Node ID	
	Crest	
	Width	
	Height	
	Angle	
	Bar Width	
	Bar Spacing	
Gates	Upstream Node ID	
	Downstream Node ID	
	Invert Level	
	Width	
	Opening	
	RTC Parameters	If a gate is "variable" and requires RTC, then RTC information has been provided.
Inflow Informa-tion	Delineation	
	Meter Data	
	Dye/Smoke Test Results	To be included when dye and smoke testing is completed.
	Building/Road/ Parking (Impervious)	
	Population/Water Use Data	
	Contour Information	
	Pipe Condition	

4.0 MODEL CALIBRATION

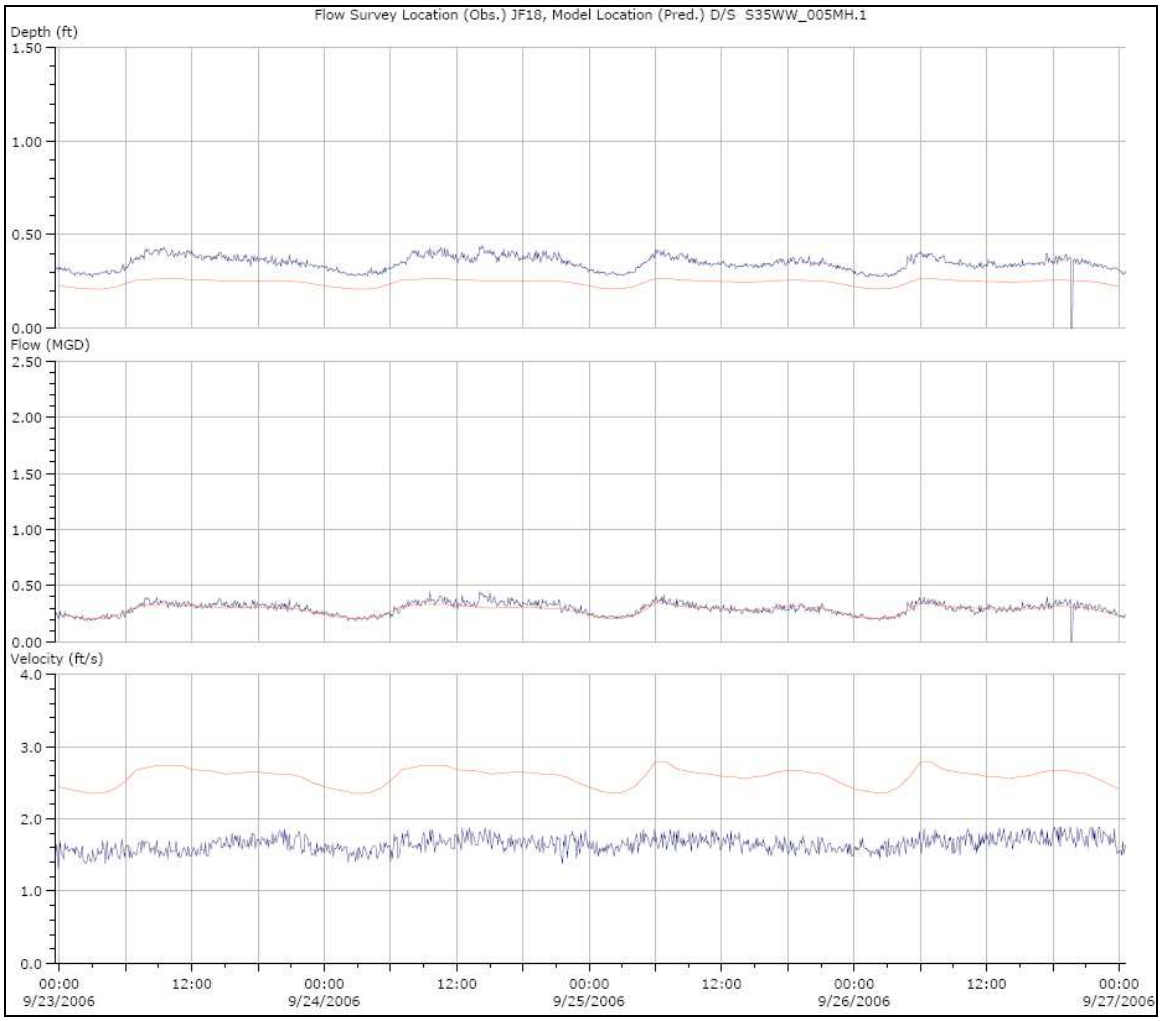
4.1 General

After the network of the model has been developed and flows inputted, the next step of the development process is calibrating the model. This consists of changing characteristics of the network and subcatchments to accurately portray what is happening in the real world.

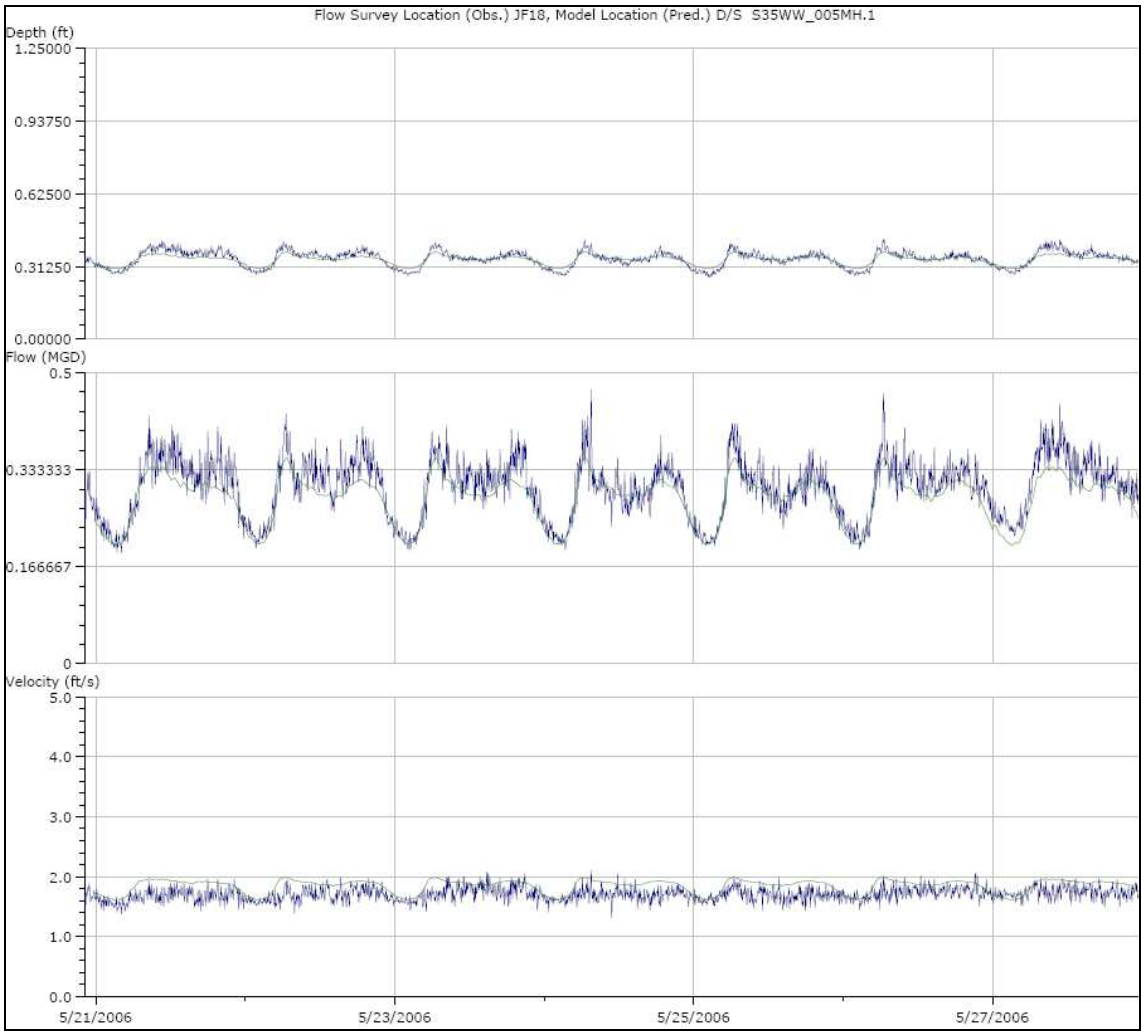
Model calibration consists of two steps. The first step is dry weather calibration. This is the process of modifying the network to reflect what is actually happening in the sewer system during a normal dry day. Following dry weather calibration, the second step is wet weather calibration. This is the process of adjusting subcatchments parameters to behave as they do in the real world.

4.2 Dry-Weather Calibration

The dry weather calibration begins with incorporating significant defects identified during the CCTV inspection. Sediment depths, blockages, and other flow restrictions are identified and then incorporated into the model. Based on the type of defect identified, Manning's "n" is changed to reflect increased roughness. Once the network has initially been populated and simulation is run to get a first glimpse of the behavior of the model. Following the simulation, "Observed vs. Predicted" plots are generated at the flow monitoring sites to see how the model behaves compared to the flow meter data. Any sites that require modification to meet flow depth, volume of flow, and velocity are adjusted to match the flow meter. For example, from an initial run at JF18 as depicted on the following plot, it is apparent that the flow volume and hydrograph shape match well, but the predicted velocity is higher and the predicted depth is lower than the measured values.



To resolve this situation, the flow needs to be slowed down. To accomplish this, Manning's "n" was changed from 0.013 to 0.018 for several pipe segments upstream and downstream of the monitoring site. Once the changes have been made, the predicted results now closely match the flow meter data, as shown on the following plot.



4.2.1 Calibration Criteria

According to Section 7.4 of the BaSES manual, the dry weather calibration should be within:

- The modeled peak flow rate should be within 10 to 20 percent of the observed
- The modeled volume of flow should be within 10 to 20 percent of the observed
- The timing of the peaks should be within 1 hour

4.2.2 Comparison of Metered and Modeled Results

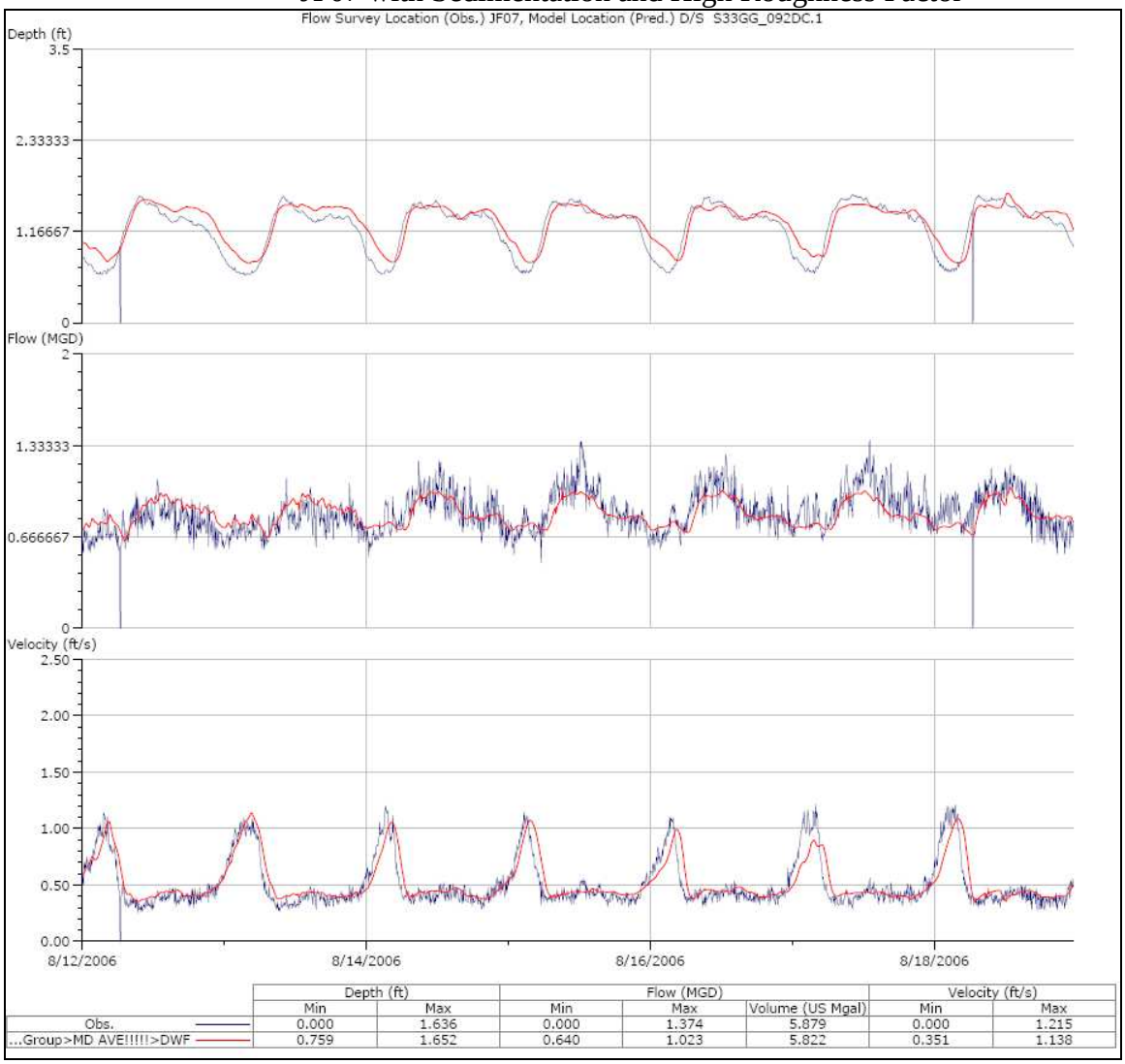
All of the meters in the Jones Falls generally meet these requirements as can be seen in Attachment 1, Dry Weather Observed Vs. Predicted Plots for 75 of the 78 flow meters. Meter JFZOO was not included because there are no pipes in the model for the JFZOO meter. This is a private sewer where the purpose of the meter was to capture the volume of flow entering the public system. Meters JFOF and JFL are not included because there is no flow in those pipes in both the flow

meter data and the predicted results from the model. These two pipes are overflow pipes from the Jones Falls Pump Station.

On the Observed Vs. Predicted plots, the depth of flow (top graph), is set to the pipe diameter to assist in estimating the magnitude of the flow depth. Some meters appear uncalibrated when reviewing the Observed Vs. Predicted plots. Those meters and a brief description as to why are as follows:

- JF07 – The depths and velocities could not be matched without the addition of sever sedimentation, over 2 feet, and high roughness factors, 0.020. The meter is located at the upstream reach of a siphon, which impacts the flow. The siphon and main interceptor at this location has yet to be internally inspected. Following inspection, any observations that impact the flow hydraulics will be added to the model and verified against the observed flow data.

JF07 with Sedimentation and High Roughness Factor



	Depth (ft)		Flow (MGD)			Velocity (ft/s)	
	Min	Max	Min	Max	Volume (US Mgal)	Min	Max
Obs.	0.000	1.636	0.000	1.374	5.879	0.000	1.215
...Group>MD AVE!!!!!>DWF	0.759	1.652	0.640	1.023	5.822	0.351	1.138

- JFINL – The flow volume appears to be too low. This meter only has data starting February 21, 2007. The flows inputted into the model upstream are based on dryer weather conditions than the spring of 2007. In addition all of the flow meters upstream and downstream have a volume match.

- JFPS – The depths and velocities could not be matched. This meter is just upstream of the Jones Falls Pump Station and is affected by its performance. Since the end of the monitoring period the pump station has undergone significant modifications. Because of this, minimal effort was put into calibrating the old pump station during the monitoring period. For the baseline and future conditions model, the pump station as it is today with all of its improvements will be fully developed.

- JFS5 – The timing of the hydrographs appear to be off. This relates to what time period the diurnal curves were developed and when meter data is available. The flows upstream of JFS5 are primarily based on dry summer weather, but the time period shown is in December, 2006, after the known time shift.

- JFWRR01 – Depth and volume appear to be off. There are a series of sluice gates upstream of JFWR01 and JFWRR01 and depending on the gate's positions the flows will fluctuate in both JFWR01 and JFWRR01. Changes in the observed hydrographs for both meters are apparent when gates have been changed.

- TSJF02B – No flow appears. This is correct, there is no flow in the predicted information and this is verified by the observed information. Upstream of this flow meter there is a weir that diverts all of the dry weather flow into the parallel interceptor. Only during extreme wet weather conditions does this flow meter see any flow.

4.2.3 QA/QC Analysis

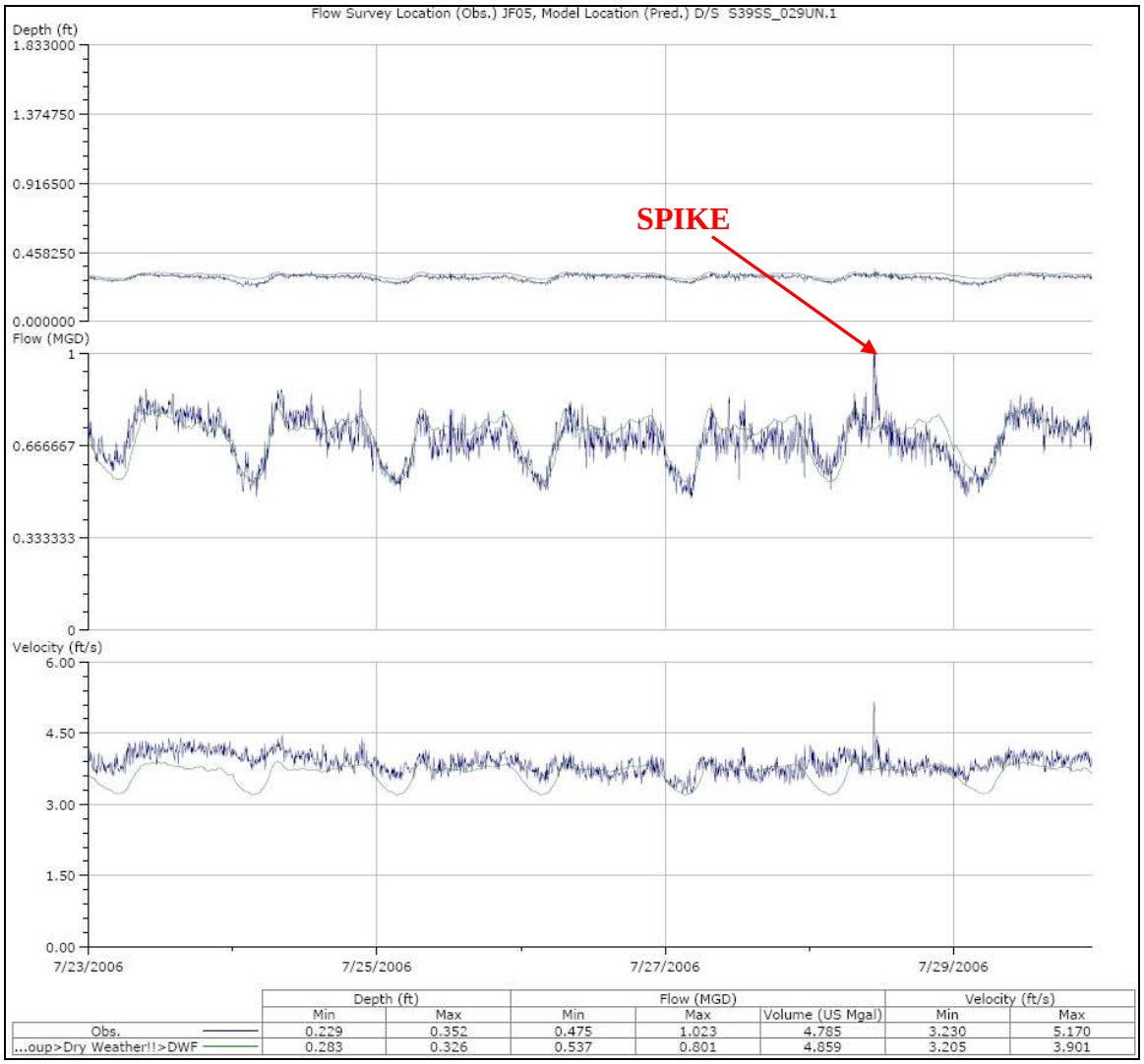
To assess the accuracy of the performance of the model compared to the observed data, the Observed Vs. Predicted plots were used. The shape and timing of the hydrographs are compared to the observed and any major discrepancies were corrected by adjusting the diurnal curves. Depths and velocities were compared and the roughness factors and sediment depths (corresponding to field work investigations) were adjusted to match the observed.

The model simulations time period for the dry weather calibration was run for one week and the volumes of the predicted vs. observed are totaled by InfoWorks for the time period. The percent differences from the predicted to the observed are show in the following Table 8, Model Volume Accuracy. As can be seen in the table, all of the meters meet the requirements of BaSES manual.

TABLE 8
MODEL VOLUME ACCURACY (MG)

Flow Meter	Predicted	Observed	% Difference	Flow Meter	Predicted	Observed	% Difference
JF01	13.11	13.386	2%	TSJF02A	11.139	9.946	11%
JF02	12.652	12.153	4%	TJSF02B	0	0	0%
JF03	12.535	12.646	1%	JF35	1.732	2.043	18%
JF04	3.417	3.245	5%	JF36	0.708	0.747	6%
JF05	4.589	4.785	4%	JF37	5.543	5.446	2%
JF06	1.157	1.325	15%	JF38	2.168	2.309	7%
JF07	5.82	5.888	1%	JF39	0.603	0.551	9%
JF08	0.822	0.872	6%	JF40	2.431	2.489	2%
JF09	8.393	8.403	0%	JF41	1.207	1.237	2%
JF10	5.796	5.853	1%	JF42	1.371	1.381	1%
JF11	12.731	12.423	2%	JF43	2.662	2.714	2%
JF12	9.863	10.092	2%	JF44	0.293	0.295	1%
JF13	8.158	7.198	12%	JF45	0.467	0.492	5%
JF14	6.73	6.424	5%	JF46	0.868	0.841	3%
JF15	4.513	4.341	4%	JF47	1.967	2.18	11%
JF16	12.311	11.233	9%	JFPS	101.762	97.726	4%
JF17	8.685	8.787	1%	JFINL	95.039	104.284	10%
JF18	1.986	2.133	7%	TSJF01	51.209	51.595	1%
JF19	4.644	5.063	9%	JFWR01	1.671	1.546	7%
JF20	1.9	2.001	5%	JFWRR01	26.312	22.863	13%
JF21	22.772	22.91	1%	JFWR07	1.176	1.322	12%
JF22	22.06	20.339	8%	JFWR09	1.941	2.114	9%
JF23	2.132	2.052	4%	JFWR11	0.928	0.896	3%
JF24	18.676	18.636	0%	JFWR12	0.736	0.809	10%
JF25	14.633	14.582	0%	JFWR14	6.053	5.883	3%
JF26	7.724	7.324	5%	JFWR15	2.044	2.03	1%
JF27	3.231	3.197	1%	JFWR17	0.798	0.776	3%
JF28	2.398	2.448	2%	JFWR18	0.418	0.37	11%
JF29	5.166	4.583	11%	JFWR19	3.009	2.956	2%
JF30	4.142	3.821	8%	JFWR22	0.535	0.508	5%
JF31	3.322	2.965	11%	JFWR24	2.55	2.611	2%
BJF2	0.065	0.071	9%	JFWR29	6.594	6.575	0%
BJF3	0.913	0.818	10%	JFWR31	1.843	2.074	13%
JF32	1.507	1.514	0%	JFWR33	1.39	1.421	2%
JF33	1.511	1.509	0%	JFWR34	0.627	0.58	7%
JF34	2.743	2.537	8%	JFWR35	0.627	0.586	7%
JFOUT	91.228	81.254	11%	JF03_20S	0.672	0.727	8%
JFS5	47.184	44.138	6%				

Comparisons were not run for peak flow rates because InfoWorks chooses the highest flow rate and for almost all the meters there is an unusual spike or dip in the observed flow rates completely negating any benefits of a comparison between the predicted and observed. The curves were visually inspected to ensure all peak flow rates generally matched. See the graph below for an example.



	Depth (ft)		Flow (MGD)			Velocity (ft/s)	
	Min	Max	Min	Max	Volume (US Mgal)	Min	Max
Obs.	0.229	0.352	0.475	1.023	4.785	3.230	5.170
...oup>Dry Weather!!>DWF	0.283	0.326	0.537	0.801	4.859	3.205	3.901

4.3 Wet-Weather Calibration

Following completion of the dry weather calibration, wet weather calibration was initiated. As stated in Section 2.4, capture coefficients were developed from Sliicer.com and entered into the model's sub-catchments as "Fixed Runoff Coefficients". The first model runs were based on InfoWorks default values for basin slope and basin width and initial values of 0.015 for runoff routing values (roughness factor). Some of the sub-catchments had to be divided into two runoff areas to capture both large and small events as outlined as a possibility in the BaSES manual (V07.01) Section 7.4.6. The main area captured the volume of rain for smaller events and the secondary area had a large precompensation value, approximately 2 inches, to capture additional rain for larger events.

After reviewing the results and looking at all of the 26 storm events, different criteria were adjusted to more accurately predict the flow meter responses. Based off the sensitivity analysis completed for the model, adjustments were made. For example, if the flow volume was not enough, the runoff coefficients were made larger, if the timing was off, the slope and the runoff routing value were adjusted, and to adjust the recovery duration and peak timing, the basin width was adjusted.

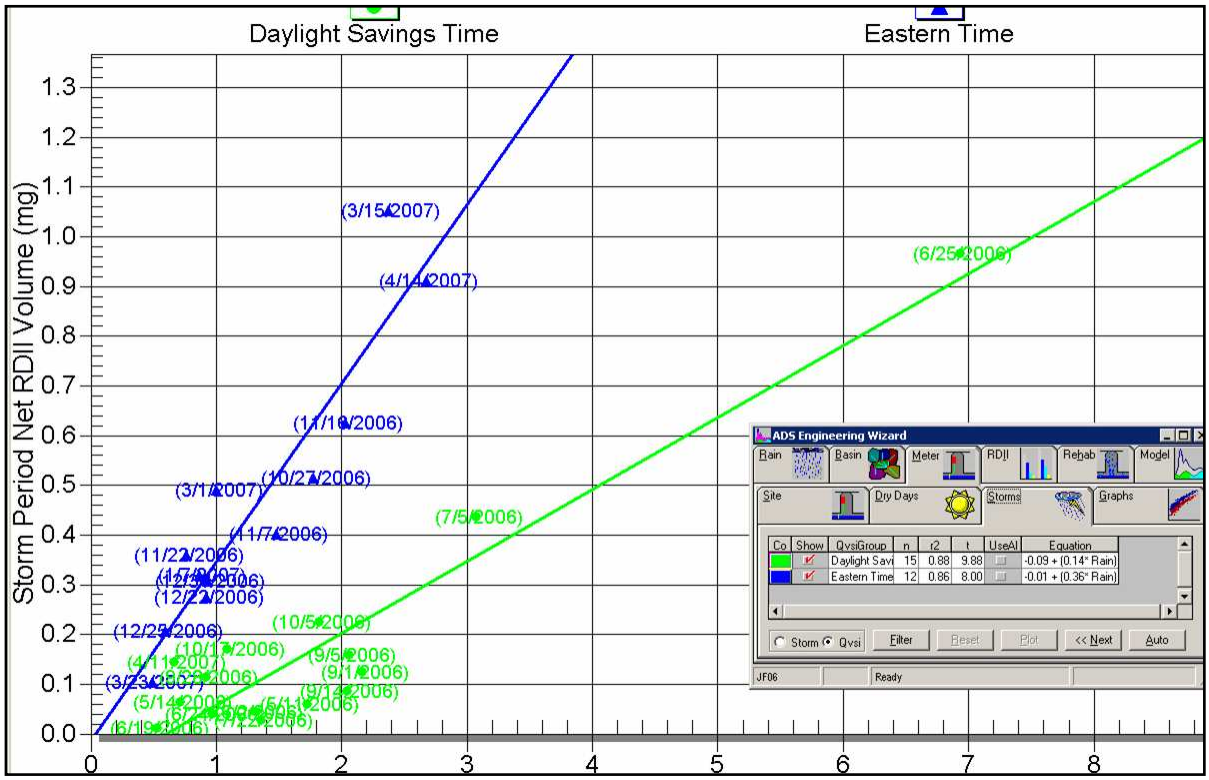
4.3.1 Calibration Criteria

According to the BaSES manual, the following are guidelines for the wet weather calibration:

- the modeled peak flow rate should be within -10 percent and +25 percent of the observed peak rate,
- the modeled volume of flow should be within +20 percent and -10 percent of the observed,
- the modeled depth of flow in surcharged sewers should be within +18 inches and -4 inches in sewers 21 inches in diameter and larger (within +6 inches and -4 inches in sewers smaller than 21 inches in diameter) of the observed,
- the modeled depth of flow at unsurcharged critical points in the system, i.e., at SSO structures, should be within 4 inches of the observed, and
- the shape and timing of the hydrographs should be similar.

4.3.2 Comparison of Metered and Modeled Results

When looking at the metered vs. modeled results, Appendix 1 and Attachment 2, it appears that the model may not be sufficiently calibrated. This is due to the behavior differences of summer and winter storms. Summer storms typically are of shorter duration and higher intensity than winter events. In addition, the ground is dryer and the water table is lower than compared to winter. This leads to less runoff per rain volume than compared to winter storms. Winter storms are typically longer in duration, but lower in intensity than summer events. With the ground wetter and the water table higher, more runoff occurs per same rain amount for winter storms as compared to the summer storms. The graph below helps demonstrate this behavior:

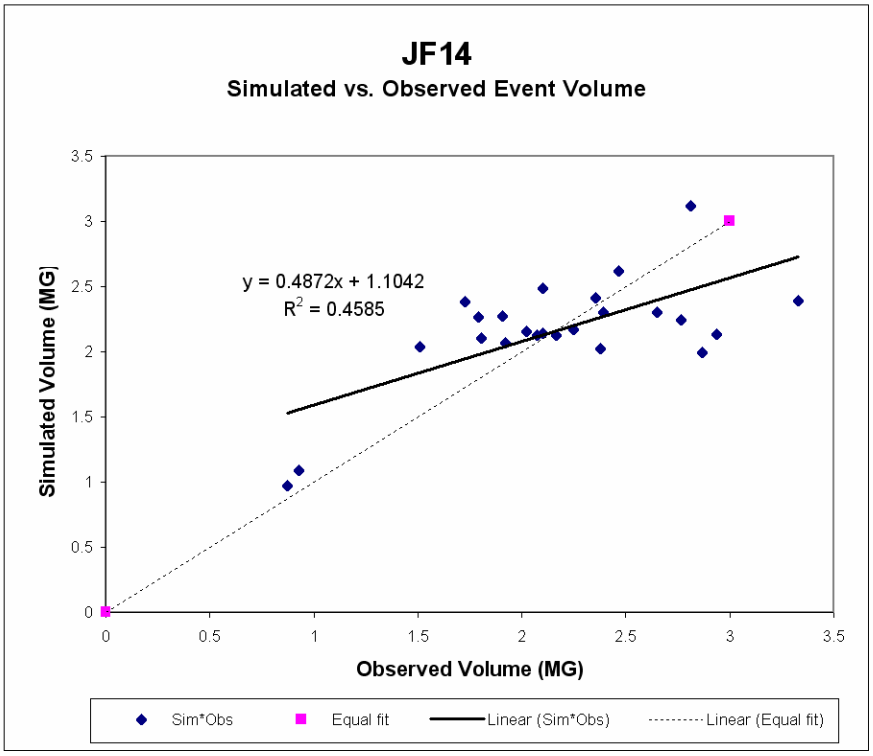


The winter storms are shown on the top line with triangles and the summer storms are shown on the bottom line with circles. From this graph it is observed that more than twice the amount of rain enters the sewers during the winter as compared to the summer. This led to difficulties in trying to calibrate the model to accurately predict both type of storm events. If the model is calibrated to only summer events, potential deficiencies in the system may not be fully captured, however, if only calibrated to the winter storms, required improvements may be grossly over-predicted. A median R value was used in the model as a compromise. By using this method, the model over-predicts summer storms, but under-predicts winter storms. However, the calibration guidelines are generally met.

4.3.3 QA/QC Analysis

To assess the validity of the model compared to the flow meter observed responses a series of graphs (statistical comparison plots) were produced as outlined in BaSES. See Appendix 1 for a summary of observed versus predicted responses for each meter and graphs comparing observed versus predicted volumes and peak flow rates. The numbers used in comparing the volumes are based on a 2-day duration starting at the beginning of the storm event. Ideally, on the statistical comparison plots, a regression line with an R^2-value close to 1.00, indicates the goodness-of-fit between the modeled and observed peak flows and volumes, and an intercept of the regression line close to zero indicates that the modeled event volumes and peak flow rates are not biased (i.e., consistently over-

predicting or under-predicting) with respect to the monitored volumes and peak flow rates. However, when using the median "R" value as discussed above, regression lines tend to vary from those parameters. The summer type storms, which are over-predicted, have less I/I per rain depth than the winter storms, which are under-predicted. This skews the graph away from the ideal situation. As shown in the graph below, the majority of the storms are over-predicted, but with a few of the winter storms under-predicted, the regression line is pulled away from an intercept of zero and a slope of 1.



The design storms to be used in the capacity analysis are more typical of the summer type storms rather than the winter type storms. With the Jones Falls model calibrated to a middle range, this provides a conservative capacity estimate, while not over-designing alternatives as compared to a model that extremely over-predicts the summer storms to meet the winter storm runoff volumes.

In addition, the observed Vs. predicted graphs generated by InfoWorks were reviewed to asses the shape and timing of the hydrographs. Attachment 3 on the included CD contains PDF hydrographs files for each meter and each storm event.

5.0 SUMMARY AND CONCLUSIONS

The hydraulic model of the Jones Falls Sewershed has been built in accordance with the Consent Decree and as outlined in the BaSES manual. The network was built from field verified GIS information and the flow inputs are based on 78 individual flow meters installed for over one year. Dry weather calibration was completed without having to use any unrealistic conditions, for example using a Manning's "n" less than 0.009. The wet weather calibration had to use a median "R" value to capture the differences between winter and summer storm events. However, when looking at all of the 26 modeled storms as a whole and balancing the differences, the model behaves in a realistic fashion. Based on these facts and the provided supporting material, the Jones Falls hydraulic model has been deemed "calibrated"; therefore the baseline and future flows capacity assessment can begin.

FIGURES

Northern Pkwy.
Reisterstown Rd.
York Rd.
The Alameda
Perring Pkwy.
Cold Spring Ln.
Park Heights Ave.
Liberty Rd.
33rd St.
Charles St.
Harford Rd.
Belair Rd.
Gwynns Falls Pkwy.
North Ave.
Franklin St.
Fayette St.

MARYLAND 129
MARYLAND 140
MARYLAND 26
MARYLAND 25
MARYLAND 542
MARYLAND 45
83

N
W E
S

Sub-Sewersheds

- Barclay St.
- Bolton Hill
- Greenmount Ave
- Hampton Avenue
- Lower Jones Falls
- Maryland Avenue
- Stoney Run
- Upper Jones Falls
- Western Run

Map Features

- Streams
- City Boundary

RK&K
RUMMEL, KLEPPER & KAHL, LLP

Achieving is working dpw together

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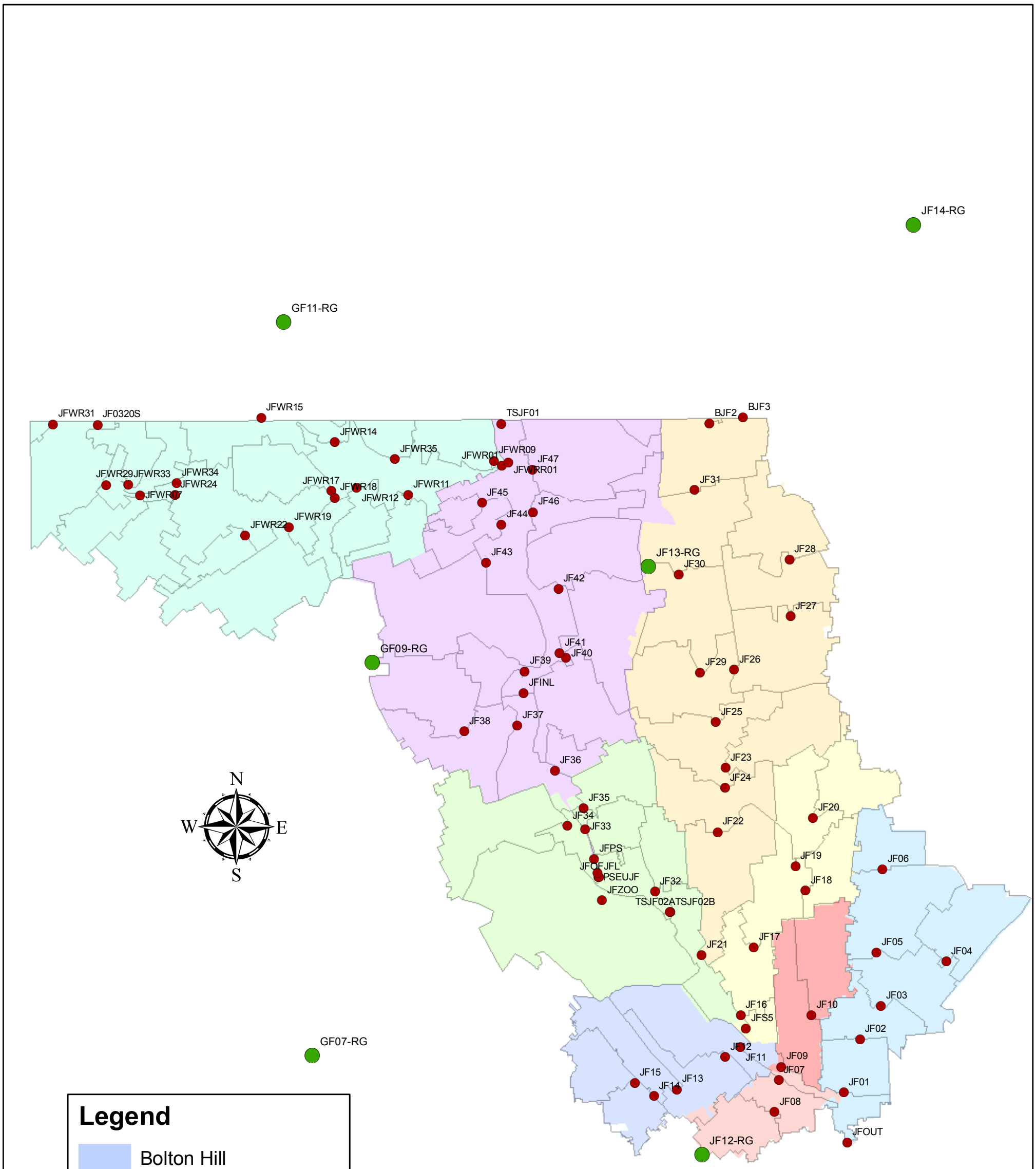
JONES FALLS COLLECTION SYSTEM EVALUATION & SEWERSHED PLAN - PROJECT 994

JONES FALLS SEWERSHED PROJECT AREA

Scale	Date	Figure No.
1" = 3000'	August 2008	1


JF14-RG
GF11-RG
JFWR31
JF0320S
JFWR15
TSJF01
BJF2
BJF3
JFWR14
JFWR35
JFWR01
JFWR09
JF47
JFWRR01
JFWR29
JFWR33
JFWR34
JFWR24
JFWR07
JFWR17
JFWR18
JFWR12
JFWR11
JF31
JF45
JF46
JF44
JFWR22
JFWR19
JF43
JF13-RG
JF28
JF30
JF42
JF27
GF09-RG
JF41
JF40
JF39
JF29
JF26
JFINL
JF25
JF38
JF37
JF36
JF23
JF24
N
W
E
S
JF35
JF34
JF33
JF22
JF20
JFPS
JFOFJFL
PSEUJF
JFZOO
JF32
TSJF02ATSJF02B
JF19
JF06
JF18
JF17
JF21
JF05
JF04
JF03
JF16
JFS5
JF10
JF02
JF12
JF11
JF09
JF07
JF15
JF14
JF13
JF01
JF08
JFOUT
GF07-RG
JF12-RG
Legend
Bolton Hill
Barclay Street
Greenmount
Hampton
Lower Jones Falls
Maryland
Stoney Run
Upper Jones Falls
Western Run
Flow Meter Locations
Rain Gauge Locations
KCI
RK&K
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JONES FALLS COLLECTION SYSTEM EVALUATION
& SEWERSHED PLAN - PROJECT 994
JONES FALLS FLOW METER AND
RAIN GAUGE LOCATION MAP
Scale
1" = 3500'
Date
August 2008
Figure No.
2

Baltimore County
Baltimore City

03_20S
WR15
WR31
WR 29
WR 33
WR 34
WR 17
WR 14
WR 35
WR 09
TSJF01
Western Run Interceptor and Relief Sewer - WR01/WRR01
JFWRR01
JFWR01
JF47
WR 07
WR 24
WR 22
WR 19
WR 18
WR 12
WR 11

Baltimore County
Baltimore City

JF45
JF46
JF44
JF43
JF42
JF40
JF41
JF38
JF39
JFINL
JF37
JF36
JF35
JF34
JF33
JFPS
JFOF
JFL
JFZOO
TSJF02B
JF32
TSJF02A

Baltimore County
Baltimore City

BJF2
BJF3
JF31
PSJON-NORTH
PSJON-SOUTH
Jones Falls Pump Station

JF23
JF29
JF30
JF21
JF22
JF24
JF25
Stony Run Interceptor
JF18
Hampden Interceptor
JF26
JF27
JF28
JF15
Bolton Hill Interceptor
JF14
JF13
JF12
JF11
JFS5
JF16
JF17
JF19
JF20
Barclay Interceptor
JF09
JF10
JF05
JF06
Greenmount Interceptor
JF08
JF07
Maryland Avenue Interceptor
JF01
JF02
JF03
JF04
HL09
JFOUT
HL08A
Main Outfall Interceptor

Legend

JF3 → Sewershed Sub-basin

BJF1 Main Trunk Meter

BJF1	Boundary Meter - Jones Falls 1
BJF2	Boundary Meter - Jones Falls 2
BJF3	Boundary Meter - Jones Falls 3
JFPS	Jones Falls Pump Station Influent
JFFM1	Jones Falls Force Main 1
JFFM2	Jones Falls Force Main 2
JFOF	Jones Falls Pump Sta. Overflow
JFL	Lower Jones Falls Interceptor
JFS5	Jones Falls Siphon #5
JFOUT	Jones Falls Outlet

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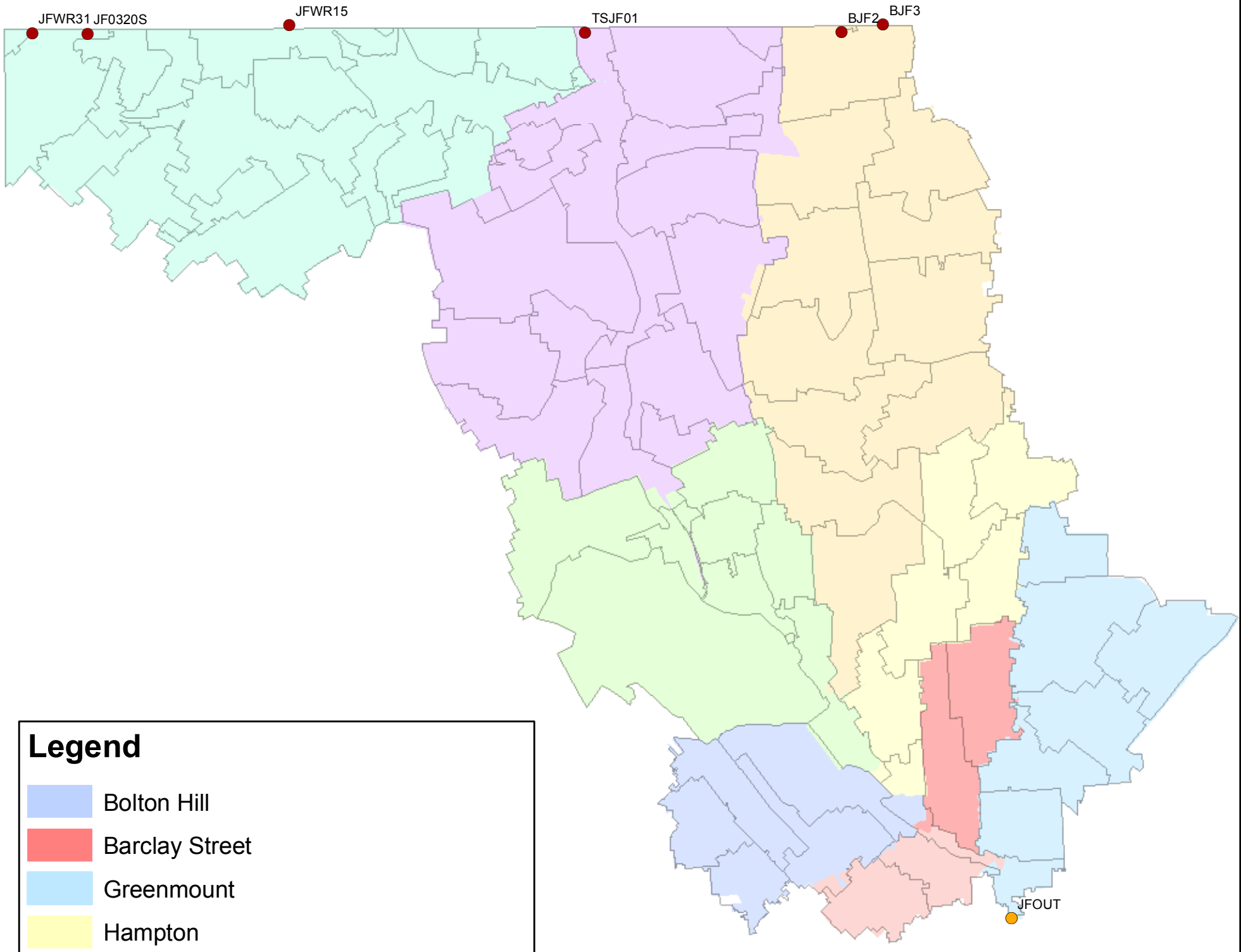
JONES FALLS COLLECTION SYSTEM EVALUATION & SEWERSHED PLAN - PROJECT 994

JONES FALLS FLOW MONITORING PLAN SCHEMATIC

Date	Figure No.
August 2008	3



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JONES FALLS COLLECTION SYSTEM EVALUATION
& SEWERSHED PLAN - PROJECT 994

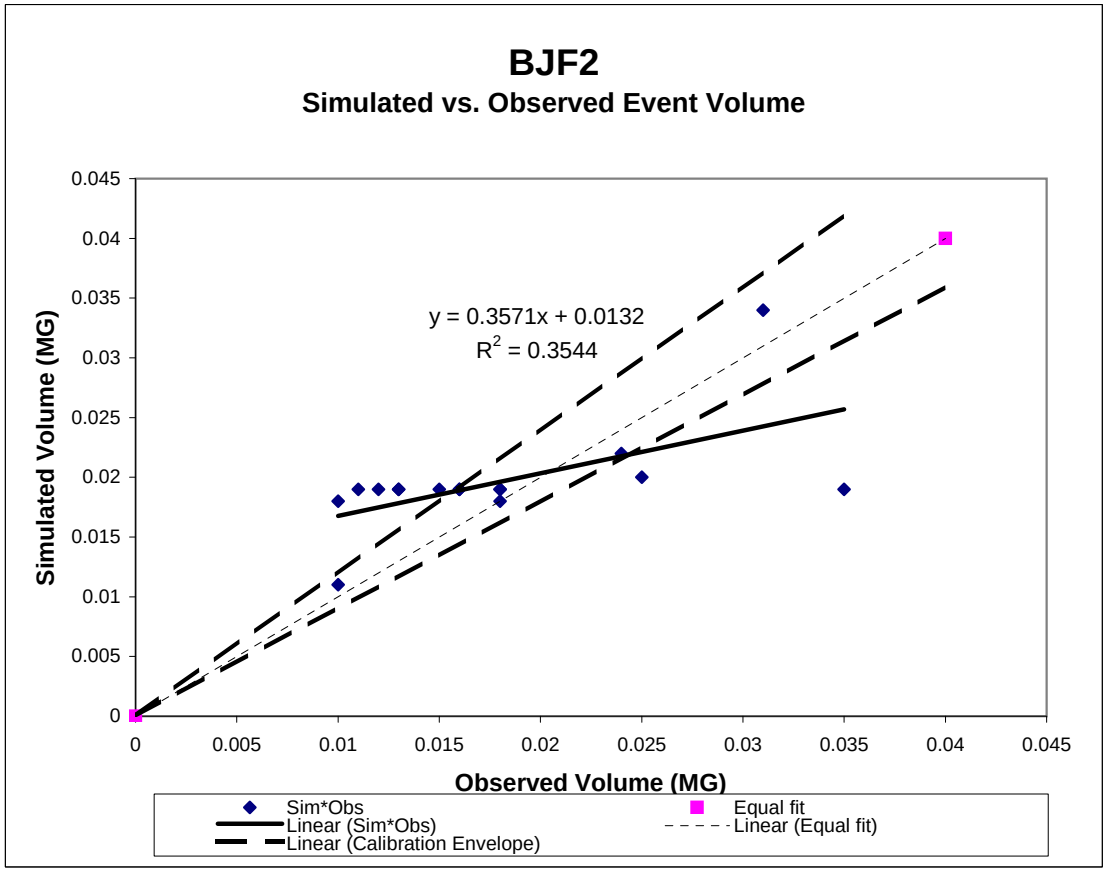
BOUNDARY CONDITIONS LOCATIONS MAP

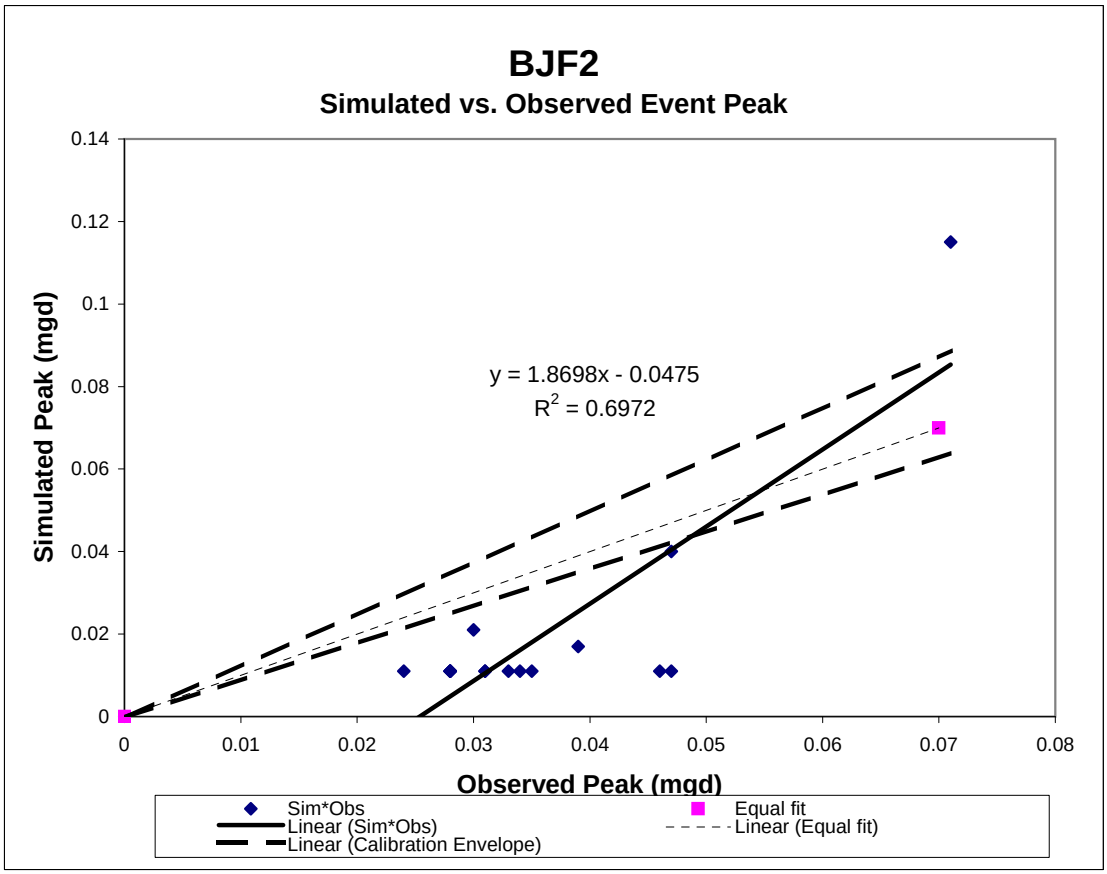
Scale	Date	Figure No.
1" = 3500'	August 2008	4

Appendix 1

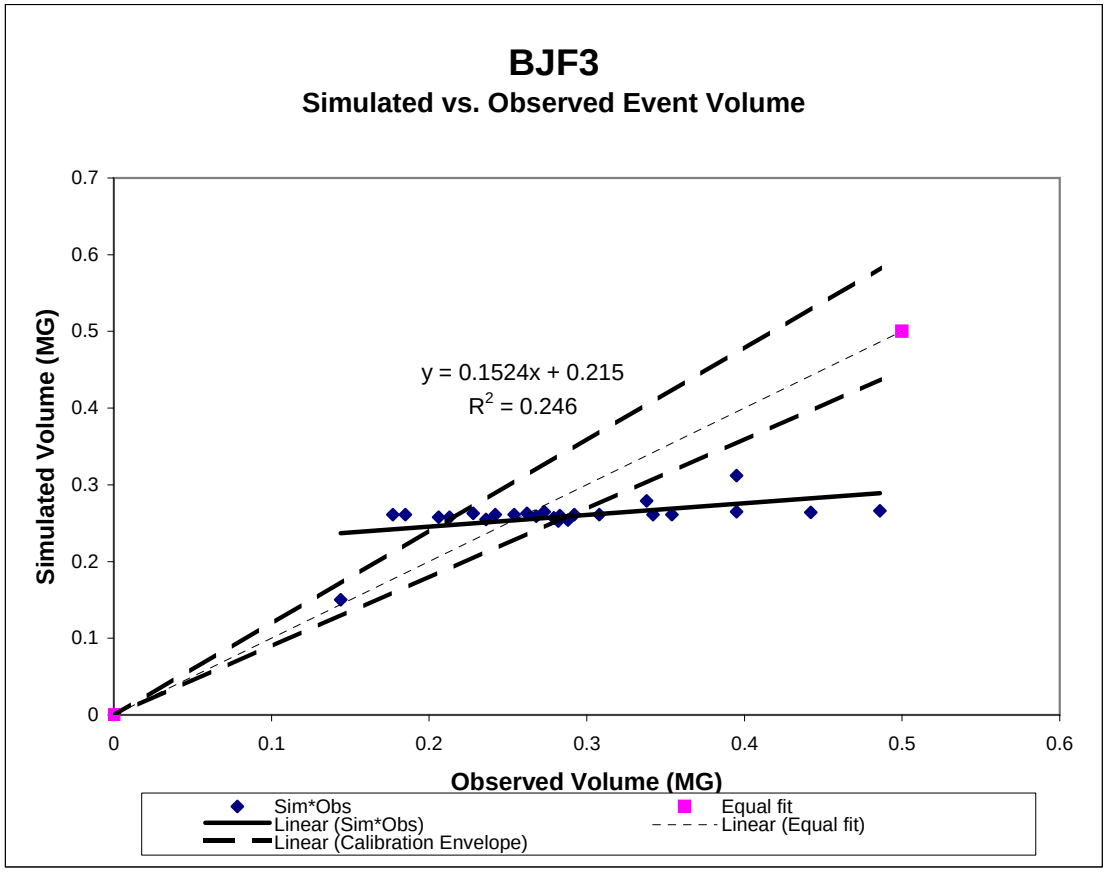
Wet Weather Observed Vs. Predicted Statistics and Graphs

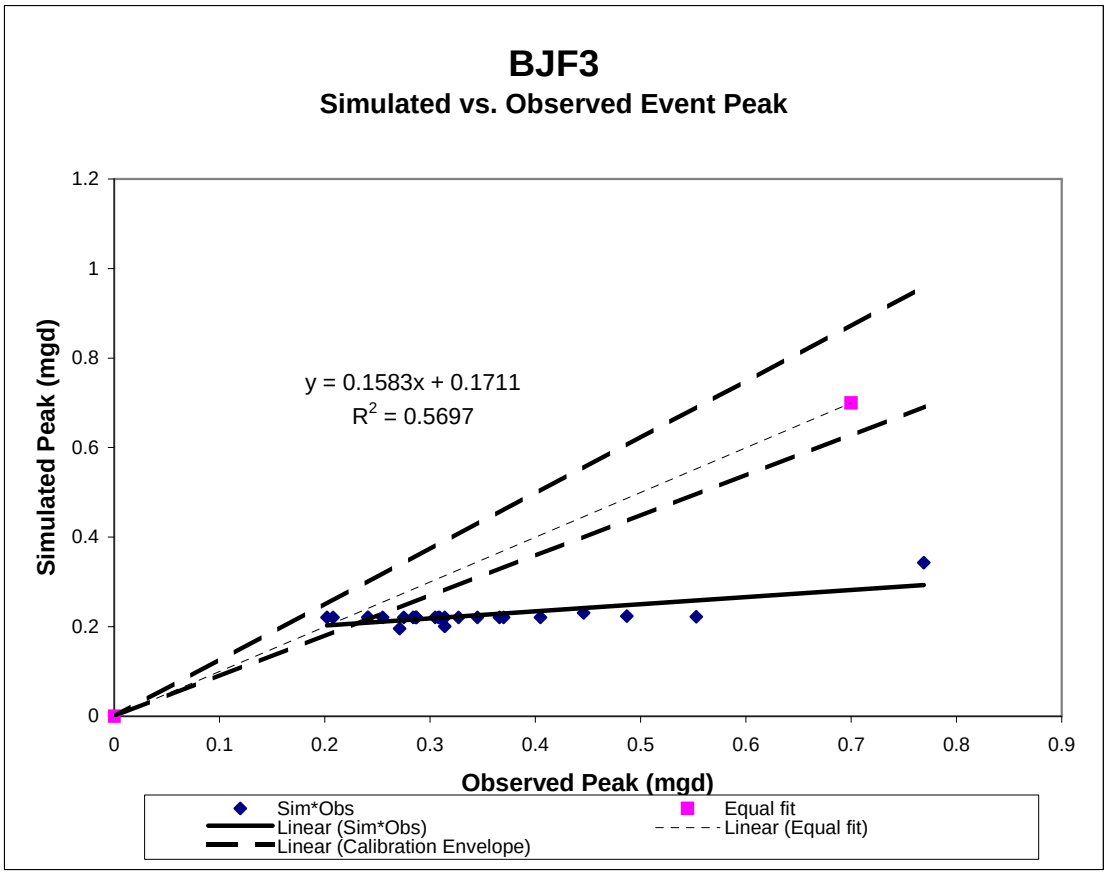
Storm Events	BJF2 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006									
June 1, 2006	0.010	0.011	10%	0.031	0.011	-65%	0.137	0.087	-0.050
June 2, 2006	0.025	0.020	-20%	0.030	0.021	-30%	0.155	0.100	-0.055
June 19, 2006	0.018	0.019	6%	0.031	0.011	-65%	0.148	0.087	-0.061
June 25, 2006	0.031	0.034	10%	0.071	0.115	62%	0.182	0.178	-0.004
July 5, 2006	0.024	0.022	-8%	0.047	0.040	-15%	0.149	0.117	-0.032
July 22, 2006	0.016	0.019	19%	0.034	0.011	-68%	0.128	0.087	-0.041
August 7, 2006	0.015	0.019	27%	0.024	0.011	-54%	0.116	0.087	-0.029
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006	0.016	0.019	19%	0.039	0.017	-56%	0.187	0.095	-0.092
November 22, 2006	0.035	0.019	-46%	0.047	0.011	-77%	0.190	0.087	-0.103
December 22, 2006	0.010	0.018	80%	0.028	0.011	-61%	0.187	0.087	-0.100
January 1, 2007	0.013	0.019	46%	0.046	0.011	-76%	0.188	0.087	-0.101
January 7, 2007	0.013	0.019	46%	0.028	0.011	-61%	0.168	0.087	-0.081
March 1, 2007	0.018	0.018	0%	0.028	0.011	-61%	0.168	0.087	-0.081
March 15, 2007	0.018	0.019	6%	0.033	0.011	-67%	0.174	0.087	-0.087
April 4, 2007	0.011	0.019	73%	0.028	0.011	-61%	0.179	0.087	-0.092
April 11, 2007	0.012	0.019	58%	0.035	0.011	-69%	0.176	0.087	-0.089
April 14, 2007									


BJF2
Simulated vs. Observed Event Volume
y = 0.3571x + 0.0132
R2 = 0.3544
Simulated Volume (MG)
Observed Volume (MG)
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
0.04
0.045
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

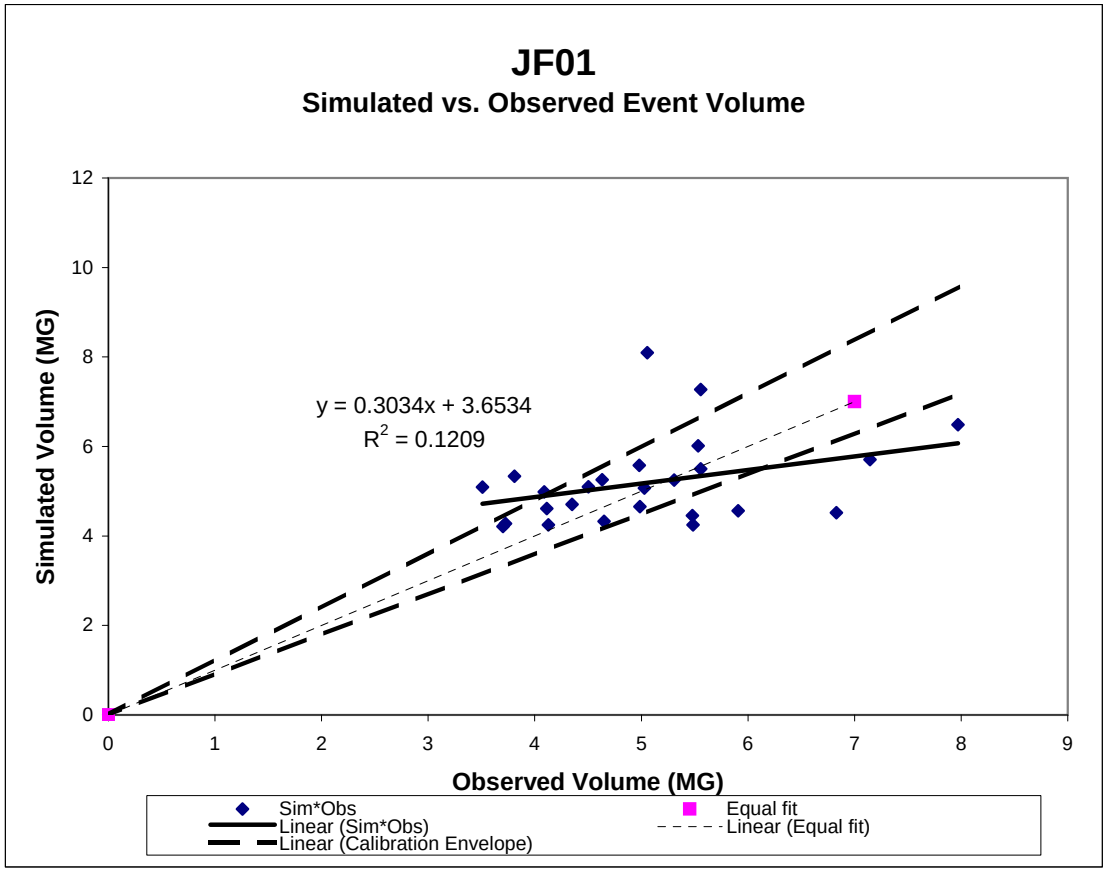

BJF2
Simulated vs. Observed Event Peak
y = 1.8698x - 0.0475
R2 = 0.6972
Simulated Peak (mgd)
Observed Peak (mgd)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

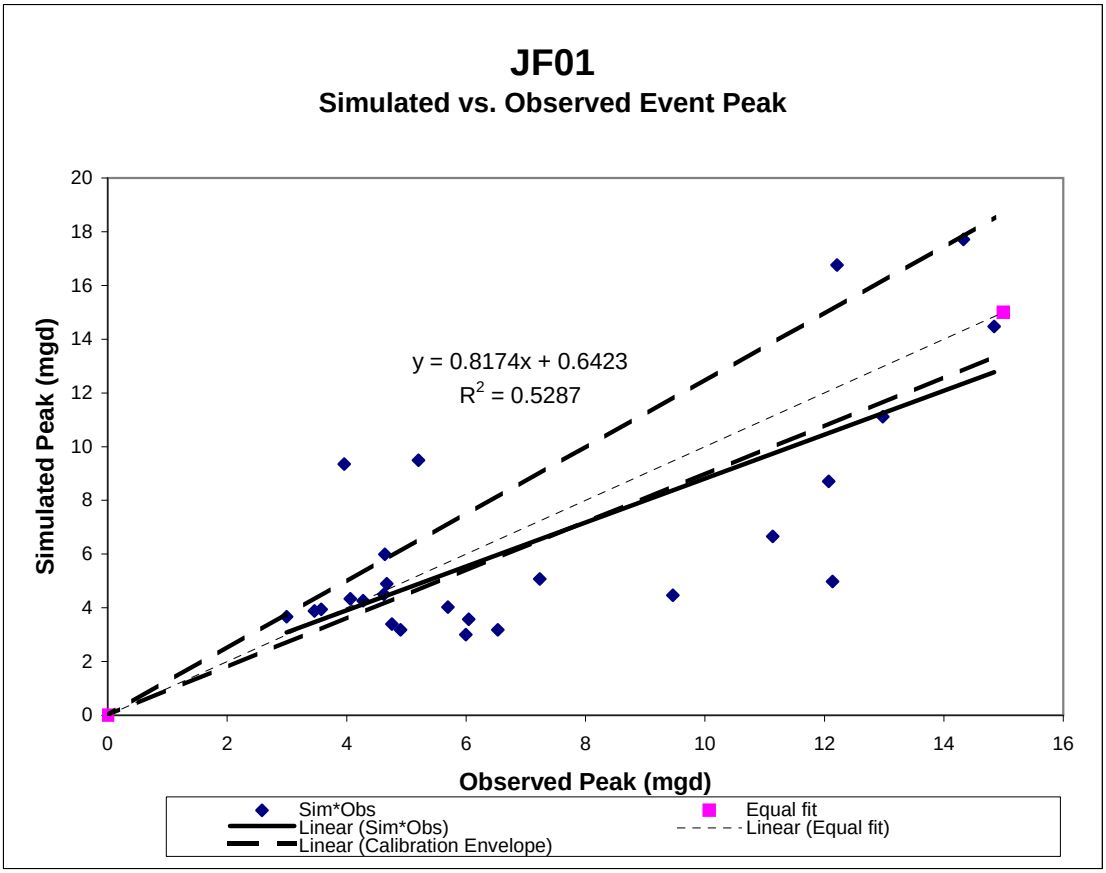
Storm Events	BJF3 8-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.236	0.255	8%	0.287	0.221	-23%	0.377	0.276	-0.101
June 1, 2006	0.144	0.150	4%	0.366	0.221	-40%	0.477	0.276	-0.201
June 2, 2006	0.273	0.265	-3%	0.314	0.201	-36%	0.397	0.263	-0.134
June 19, 2006	0.242	0.261	8%	0.241	0.221	-8%	0.376	0.276	-0.100
June 25, 2006	0.395	0.312	-21%	0.769	0.343	-55%	0.781	0.345	-0.436
July 5, 2006	0.338	0.279	-17%	0.446	0.231	-48%	0.503	0.283	-0.220
July 22, 2006	0.206	0.258	25%	0.208	0.221	6%	0.515	0.276	-0.239
August 7, 2006	0.177	0.261	47%	0.202	0.221	9%	0.450	0.276	-0.174
September 1, 2006	0.213	0.258	21%	0.241	0.221	-8%	0.495	0.276	-0.219
September 5, 2006	0.185	0.261	41%	0.286	0.221	-23%	0.508	0.276	-0.232
September 14, 2006									
September 28, 2006	0.228	0.263	15%	0.305	0.221	-28%	0.355	0.276	-0.079
October 5, 2006	0.262	0.263	0%	0.309	0.221	-28%	0.375	0.276	-0.099
October 17, 2006	0.268	0.259	-3%	0.287	0.221	-23%	0.361	0.276	-0.085
October 27, 2006	0.292	0.261	-11%	0.314	0.221	-30%	0.345	0.276	-0.069
November 7, 2006	0.254	0.261	3%	0.345	0.221	-36%	0.371	0.276	-0.095
November 16, 2006	0.288	0.254	-12%	0.553	0.222	-60%	0.513	0.277	-0.236
November 22, 2006	0.283	0.260	-8%	0.255	0.221	-13%	0.329	0.276	-0.053
December 22, 2006	0.282	0.253	-10%	0.271	0.196	-28%	0.351	0.260	-0.091
January 1, 2007	0.308	0.261	-15%	0.275	0.221	-20%	0.337	0.276	-0.061
January 7, 2007	0.279	0.257	-8%	0.284	0.221	-22%	0.362	0.276	-0.086
March 1, 2007	0.395	0.265	-33%	0.405	0.221	-45%	0.525	0.276	-0.249
March 15, 2007	0.442	0.264	-40%	0.370	0.221	-40%	0.500	0.276	-0.224
April 4, 2007	0.342	0.261	-24%	0.327	0.221	-32%	0.458	0.276	-0.182
April 11, 2007	0.354	0.261	-26%	0.308	0.221	-28%	0.470	0.276	-0.194
April 14, 2007	0.486	0.266	-45%	0.487	0.224	-54%	0.625	0.278	-0.347


BJF3
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.1524x + 0.215
R2 = 0.246
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

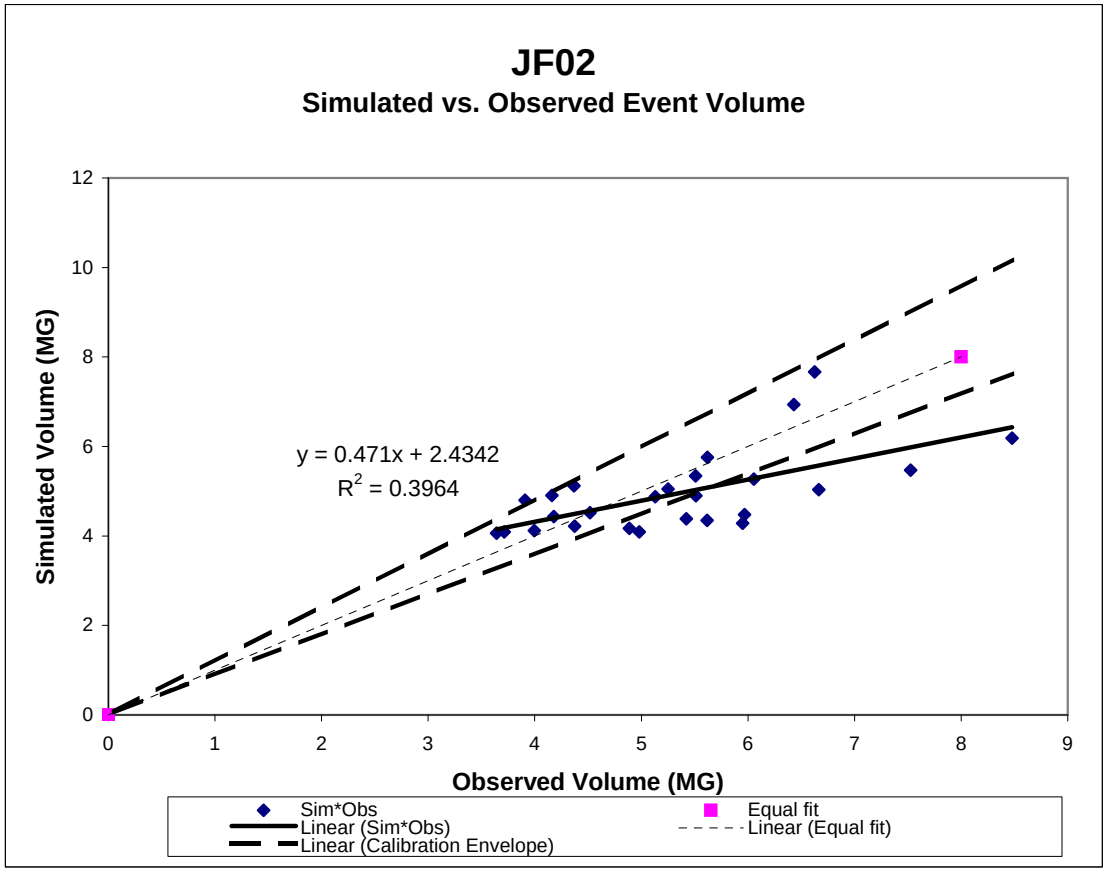

BJF3
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.1583x + 0.1711
R2 = 0.5697
0
0.2
0.4
0.6
0.8
1
1.2
0.1
0.3
0.5
0.7
0.9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

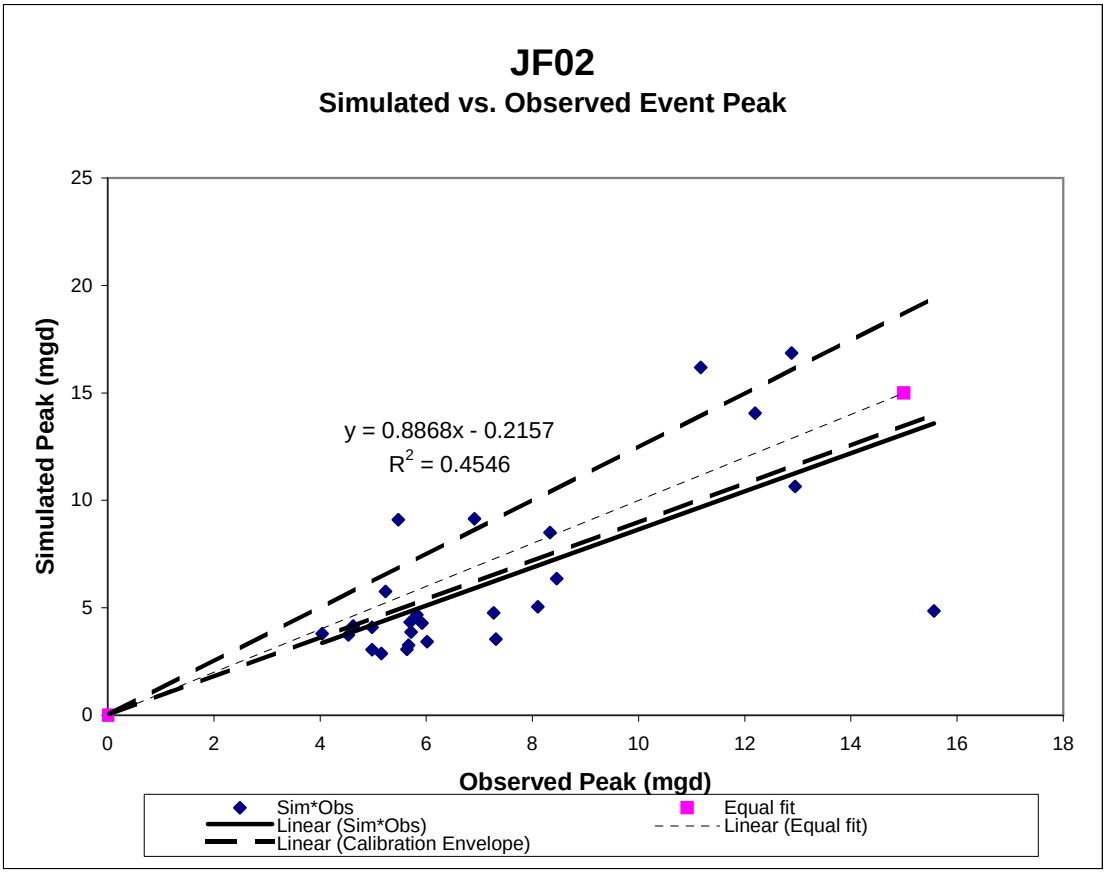
Storm Events	JF01 21-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	3.809	5.333	40%	5.202	9.494	83%	0.787	1.024	0.237
June 1, 2006									
June 2, 2006	3.509	5.090	45%	3.959	9.348	136%	0.653	0.999	0.346
June 19, 2006	3.701	4.215	14%	3.460	3.878	12%	0.609	0.611	0.002
June 25, 2006	5.055	8.095	60%	12.210	16.765	37%	4.122	2.907	-1.215
July 5, 2006	5.556	7.273	31%	14.326	17.710	24%	6.859	3.119	-3.740
July 22, 2006	4.089	4.984	22%	12.073	8.712	-28%	1.605	0.917	-0.688
August 7, 2006	3.724	4.278	15%	2.994	3.668	23%	0.579	0.593	0.014
September 1, 2006	4.979	5.575	12%	4.674	4.895	5%	0.689	0.676	-0.013
September 5, 2006	5.533	6.016	9%	14.842	14.471	-2%	5.809	2.129	-3.680
September 14, 2006	5.029	5.073	1%	3.573	3.948	10%	0.610	0.617	0.007
September 28, 2006	4.114	4.613	12%	4.623	4.502	-3%	0.731	0.653	-0.078
October 5, 2006	4.631	5.259	14%	4.062	4.341	7%	0.643	0.644	0.001
October 17, 2006	4.349	4.704	8%	4.275	4.263	0%	0.741	0.639	-0.102
October 27, 2006	5.308	5.247	-1%	7.233	5.079	-30%	3.334	0.689	-2.645
November 7, 2006	4.504	5.098	13%	4.642	5.994	29%	0.774	0.760	-0.014
November 16, 2006	5.558	5.502	-1%	12.977	11.114	-14%	6.221	1.223	-4.998
November 22, 2006	5.484	4.250	-23%	4.902	3.176	-35%	0.774	0.549	-0.225
December 22, 2006	5.907	4.561	-23%	6.045	3.579	-41%	0.710	0.585	-0.125
January 1, 2007	6.829	4.521	-34%	9.462	4.467	-53%	1.033	0.651	-0.382
January 7, 2007	5.479	4.456	-19%	4.758	3.397	-29%	0.666	0.568	-0.098
March 1, 2007	4.986	4.655	-7%	5.694	4.024	-29%	0.665	0.623	-0.042
March 15, 2007	7.144	5.707	-20%	12.135	4.975	-59%	3.308	0.681	-2.627
April 4, 2007	4.129	4.251	3%	5.996	2.998	-50%	0.737	0.535	-0.202
April 11, 2007	4.651	4.330	-7%	6.530	3.185	-51%	0.751	0.550	-0.201
April 14, 2007	7.971	6.489	-19%	11.134	6.662	-40%	3.601	0.794	-2.807


JF01
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3034x + 3.6534
R2 = 0.1209
0
2
4
6
8
10
12
0
1
2
3
4
5
6
7
8
9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

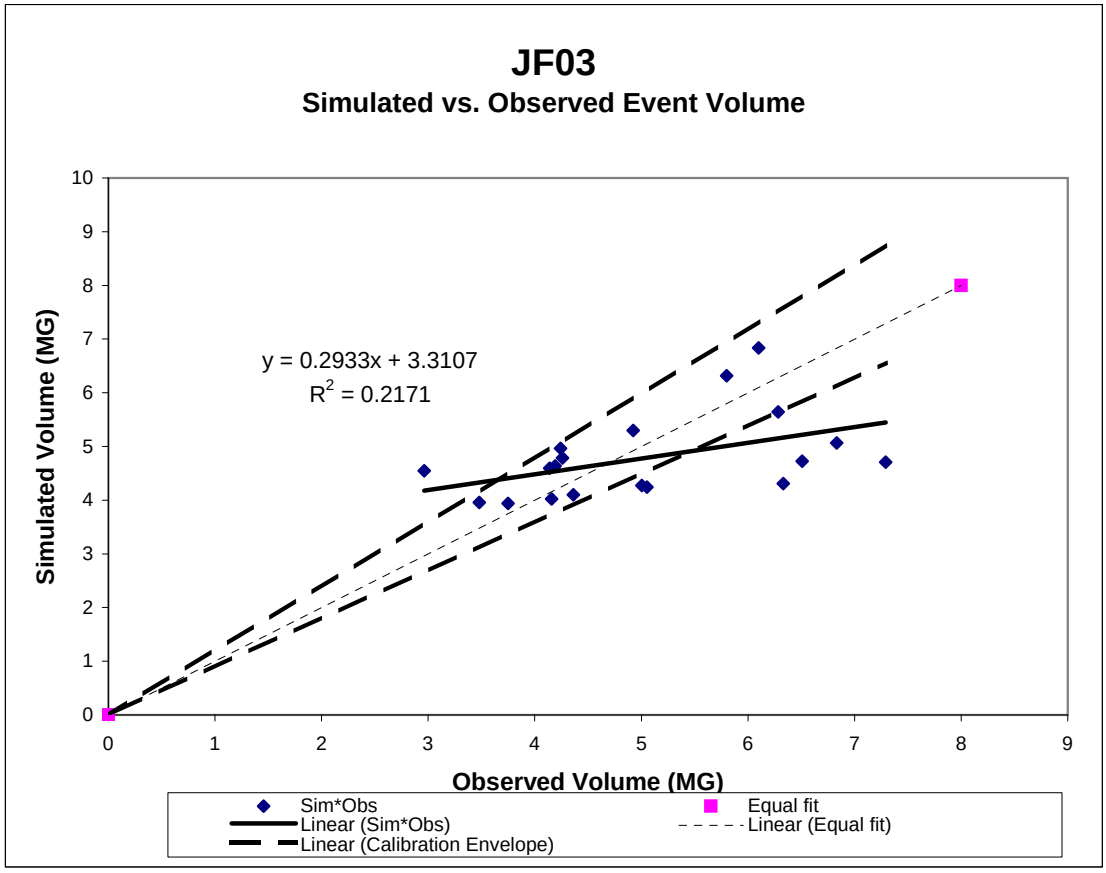

JF01
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.8174x + 0.6423
R2 = 0.5287
0
2
4
6
8
10
12
14
16
18
20
0
2
4
6
8
10
12
14
16
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

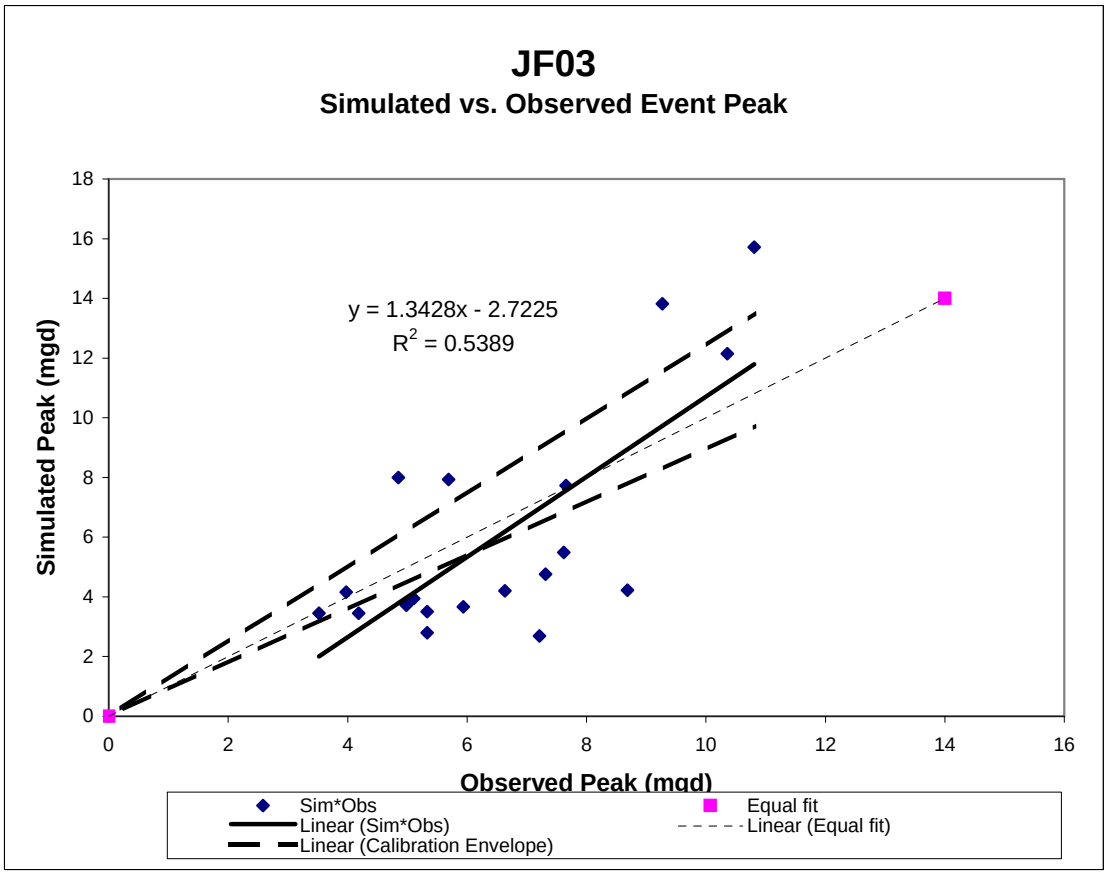
Storm Events	JF02 27-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	4.369	5.117	17%	6.909	9.135	32%	1.061	1.261	0.200
June 1, 2006	4.374	4.221	-3%	8.102	5.042	-38%	1.193	0.901	-0.292
June 2, 2006	4.162	4.906	18%	5.471	9.092	66%	0.883	1.263	0.380
June 19, 2006	3.640	4.059	12%	4.533	3.742	-17%	0.784	0.771	-0.013
June 25, 2006	6.624	7.668	16%	11.173	16.187	45%	1.938	2.260	0.322
July 5, 2006	6.431	6.935	8%	12.884	16.861	31%	2.298	4.125	1.827
July 22, 2006	3.910	4.796	23%	8.330	8.498	2%	1.204	1.206	0.002
August 7, 2006	3.995	4.118	3%	7.315	3.540	-52%	1.073	0.749	-0.324
September 1, 2006	5.510	5.342	-3%	5.826	4.682	-20%	0.942	0.858	-0.084
September 5, 2006	5.620	5.758	2%	12.193	14.063	15%	2.284	1.637	-0.647
September 14, 2006	5.129	4.876	-5%	4.040	3.795	-6%	0.756	0.776	0.020
September 28, 2006	4.180	4.434	6%	5.698	4.332	-24%	0.913	0.821	-0.092
October 5, 2006	5.251	5.049	-4%	4.625	4.159	-10%	0.812	0.807	-0.005
October 17, 2006	4.517	4.523	0%	4.982	4.089	-18%	0.835	0.802	-0.033
October 27, 2006	6.665	5.035	-24%	15.565	4.847	-69%	5.818	0.877	-4.941
November 7, 2006	5.512	4.896	-11%	5.232	5.757	10%	0.891	0.963	0.072
November 16, 2006	6.055	5.273	-13%	12.946	10.644	-18%	1.851	1.400	-0.451
November 22, 2006	4.979	4.091	-18%	4.979	3.058	-39%	0.937	0.686	-0.251
December 22, 2006	5.421	4.385	-19%	6.014	3.429	-43%	0.983	0.735	-0.248
January 1, 2007	5.618	4.347	-23%	5.917	4.289	-28%	1.002	0.817	-0.185
January 7, 2007	5.951	4.285	-28%	5.664	3.261	-42%	0.937	0.713	-0.224
March 1, 2007	5.969	4.478	-25%	5.712	3.868	-32%	0.995	0.783	-0.212
March 15, 2007	7.525	5.471	-27%	7.271	4.759	-35%	1.099	0.867	-0.232
April 4, 2007	3.713	4.092	10%	5.152	2.881	-44%	1.083	0.665	-0.418
April 11, 2007	4.888	4.168	-15%	5.635	3.060	-46%	1.007	0.686	-0.321
April 14, 2007	8.479	6.188	-27%	8.457	6.361	-25%	1.233	1.012	-0.221


JF02
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.471x + 2.4342
R2 = 0.3964
0
2
4
6
8
10
12
0
1
2
3
4
5
6
7
8
9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

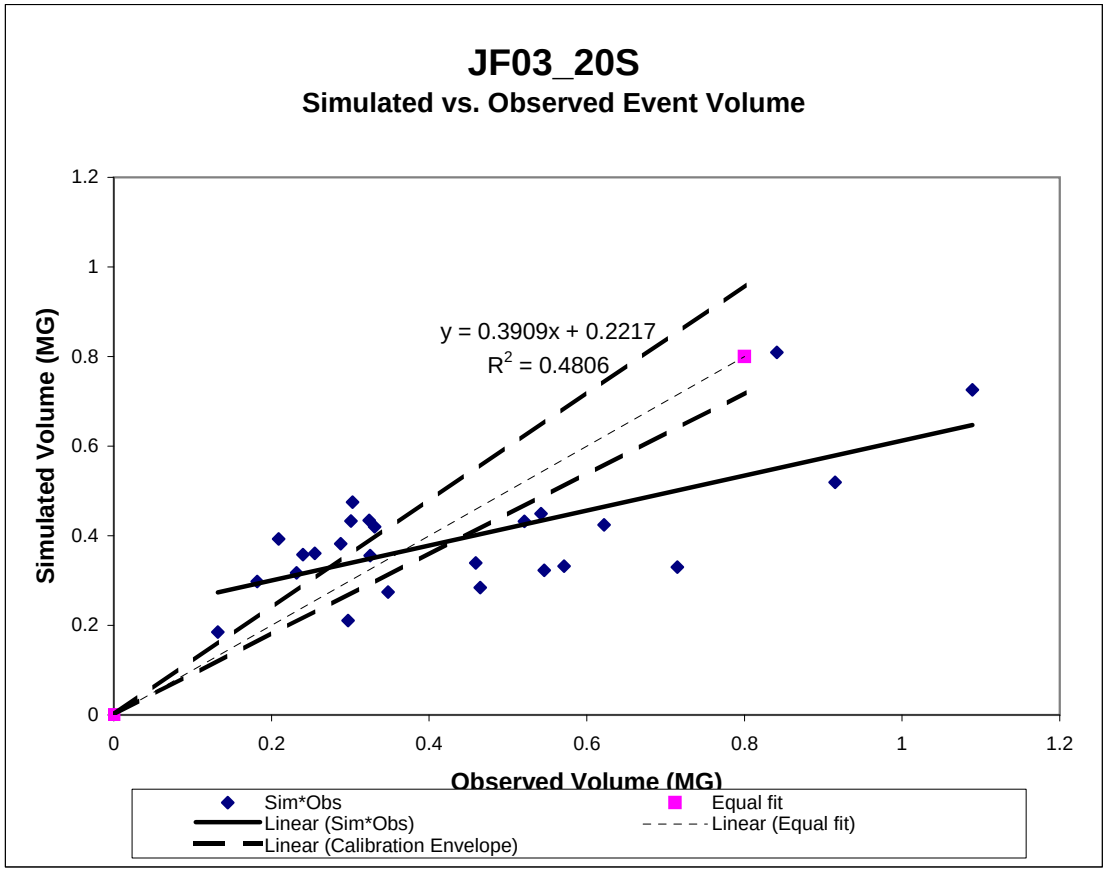

JF02
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.8868x - 0.2157
R2 = 0.4546
0
5
10
15
20
25
0
2
4
6
8
10
12
14
16
18
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

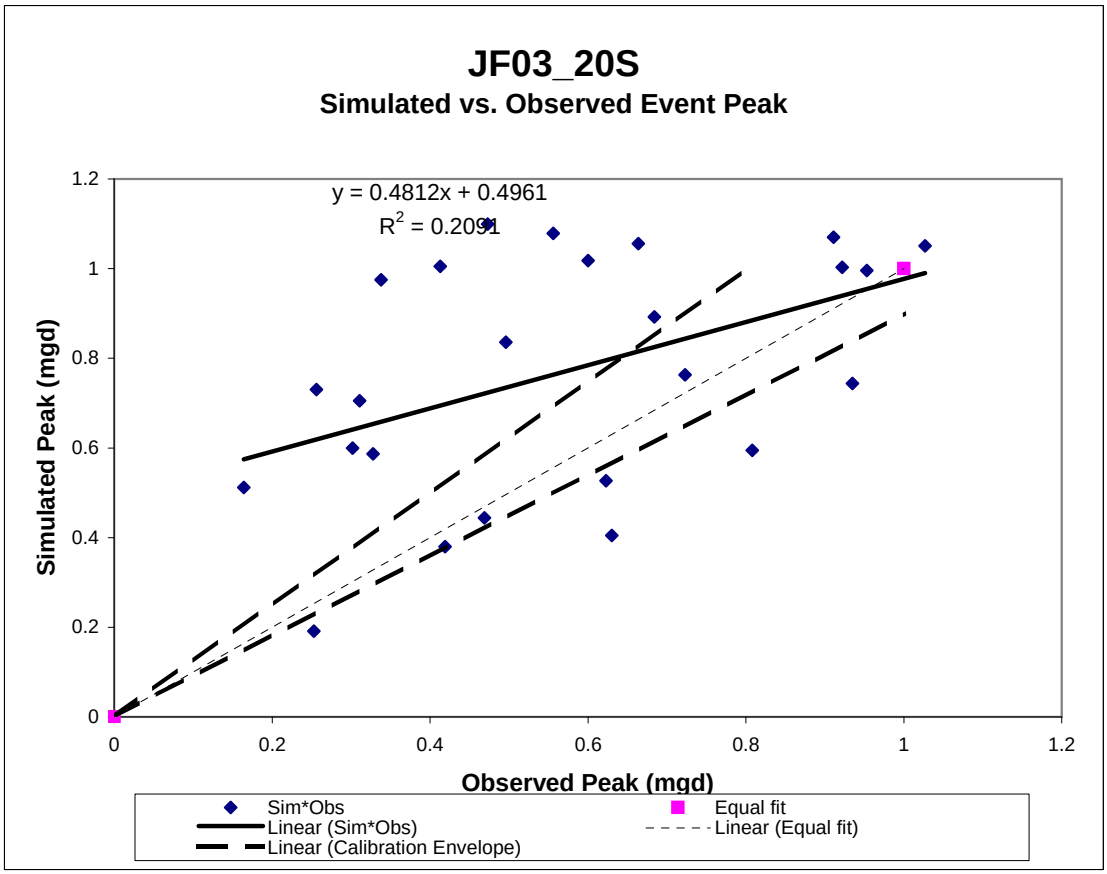
Storm Events	JF03 28x42-inch Arch Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	4.259	4.784	12%	5.690	7.934	39%	2.336	2.741	0.405
June 1, 2006	4.362	4.102	-6%	7.316	4.757	-35%	2.652	2.182	-0.470
June 2, 2006	4.190	4.637	11%	4.850	8.000	65%	2.127	2.750	0.623
June 19, 2006	3.751	3.937	5%	4.186	3.457	-17%	2.063	1.914	-0.149
June 25, 2006	6.101	6.835	12%	9.269	13.822	49%	3.027	5.388	2.361
July 5, 2006	5.799	6.316	9%	10.810	15.717	45%	3.240	7.762	4.522
July 22, 2006	2.964	4.547	53%	7.658	7.725	1%	2.619	2.706	0.087
August 7, 2006									
September 1, 2006	4.242	4.966	17%	3.978	4.159	5%	1.970	2.063	0.093
September 5, 2006	4.922	5.297	8%	10.360	12.147	17%	3.384	3.525	0.141
September 14, 2006	4.141	4.594	11%	3.518	3.453	-2%	1.716	1.913	0.197
September 28, 2006	5.051	4.241	-16%	5.105	3.943	-23%	1.984	2.021	0.037
October 5, 2006	6.508	4.724	-27%	4.983	3.721	-25%	1.827	1.973	0.146
October 17, 2006	6.331	4.311	-32%	5.938	3.663	-38%	1.903	1.960	0.057
October 27, 2006	7.293	4.710	-35%	8.686	4.227	-51%	2.391	2.076	-0.315
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007	5.005	4.275	-15%	5.331	3.504	-34%	2.791	1.925	-0.866
March 15, 2007	6.833	5.064	-26%	6.632	4.2	-37%	2.993	2.071	-0.922
April 4, 2007	3.478	3.959	14%	7.215	2.694	-63%	3.158	1.741	-1.417
April 11, 2007	4.158	4.020	-3%	5.331	2.800	-47%	2.814	1.769	-1.045
April 14, 2007	6.284	5.642	-10%	7.619	5.491	-28%	3.180	2.316	-0.864


JF03
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.2933x + 3.3107
R2 = 0.2171
0
1
2
3
4
5
6
7
8
9
10
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

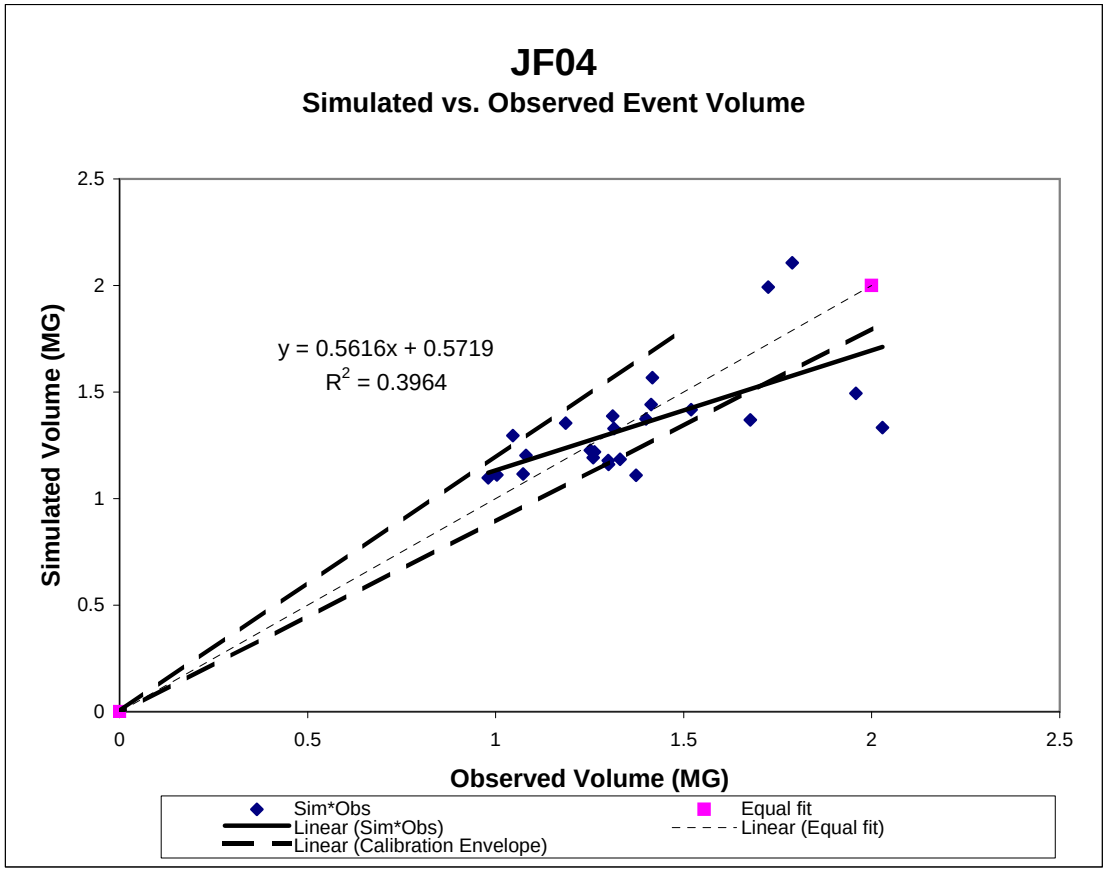

JF03
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.3428x - 2.7225
R2 = 0.5389
0
2
4
6
8
10
12
14
16
18
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

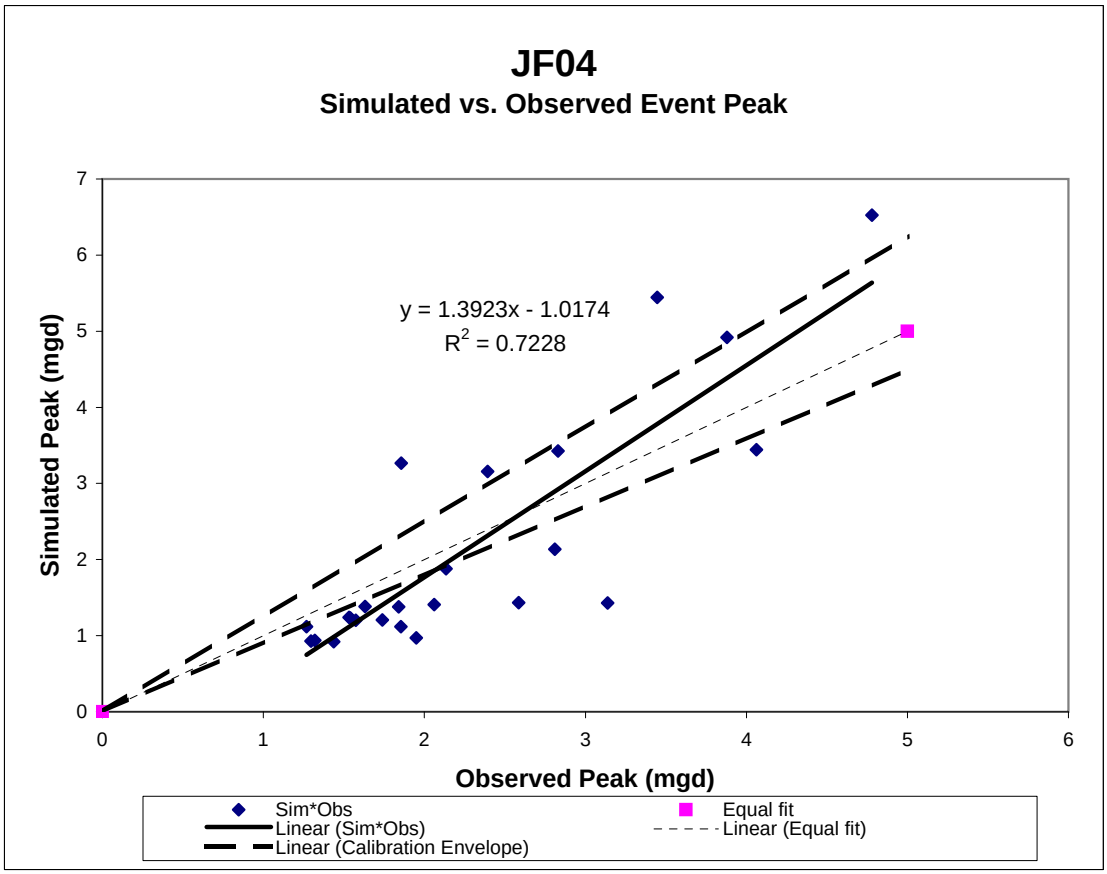
	JF0320S 8-inch Diameter Pipe								
Storm Events	**Volume (mg) (-10% to+20%)**			**Peak Flow (mgd)(-10%to+25%)**			**Depth (ft.)(-0.25' to+0.5')**		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.331	0.420	27%	0.664	1.056	59%	1.820	6.474	4.654
June 1, 2006	0.132	0.185	40%	0.256	0.730	185%	0.462	0.977	0.515
June 2, 2006	0.324	0.434	34%	0.600	1.018	70%	1.406	6.494	5.088
June 19, 2006	0.232	0.317	37%	0.556	1.079	94%	0.581	6.437	5.856
June 25, 2006	0.841	0.809	-4%	0.911	1.070	17%	3.785	6.514	2.729
July 5, 2006	0.325	0.356	10%	0.413	1.005	143%	0.540	6.419	5.879
July 22, 2006	0.240	0.358	49%	0.473	1.099	132%	0.568	6.448	5.880
August 7, 2006	0.182	0.298	64%	0.164	0.512	212%	0.664	0.427	-0.237
September 1, 2006	0.303	0.475	57%	0.311	0.705	127%	0.462	0.547	0.085
September 5, 2006									
September 14, 2006	0.209	0.393	88%	0.302	0.600	99%	0.397	0.462	0.065
September 28, 2006	0.255	0.361	42%	0.338	0.975	188%	0.412	6.200	5.788
October 5, 2006	0.301	0.433	44%	0.328	0.587	79%	0.437	0.457	0.020
October 17, 2006	0.288	0.382	33%	0.496	0.836	69%	0.557	3.047	2.490
October 27, 2006	0.521	0.432	-17%	0.723	0.763	6%	2.390	1.445	-0.945
November 7, 2006	0.542	0.449	-17%	0.922	1.003	9%	3.029	6.439	3.410
November 16, 2006	0.622	0.424	-32%	1.027	1.051	2%	3.878	6.479	2.601
November 22, 2006	0.465	0.284	-39%	0.469	0.444	-5%	0.524	0.397	-0.127
December 22, 2006	0.459	0.339	-26%	0.623	0.527	-15%	1.498	0.433	-1.065
January 1, 2007	0.546	0.323	-41%	0.684	0.892	30%	1.670	4.092	2.422
January 7, 2007	0.571	0.332	-42%	0.630	0.405	-36%	0.817	0.379	-0.438
March 1, 2007	0.715	0.330	-54%	0.808	0.595	-26%	2.520	0.460	-2.060
March 15, 2007	0.915	0.519	-43%	0.935	0.744	-20%	2.848	1.263	-1.585
April 4, 2007	0.297	0.211	-29%	0.253	0.191	-25%	0.398	0.249	-0.149
April 11, 2007	0.348	0.274	-21%	0.419	0.380	-9%	0.495	0.366	-0.129
April 14, 2007	1.089	0.726	-33%	0.953	0.996	5%	3.143	6.435	3.292


JF03_20S
Simulated vs. Observed Event Volume
y = 0.3909x + 0.2217
R2 = 0.4806
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

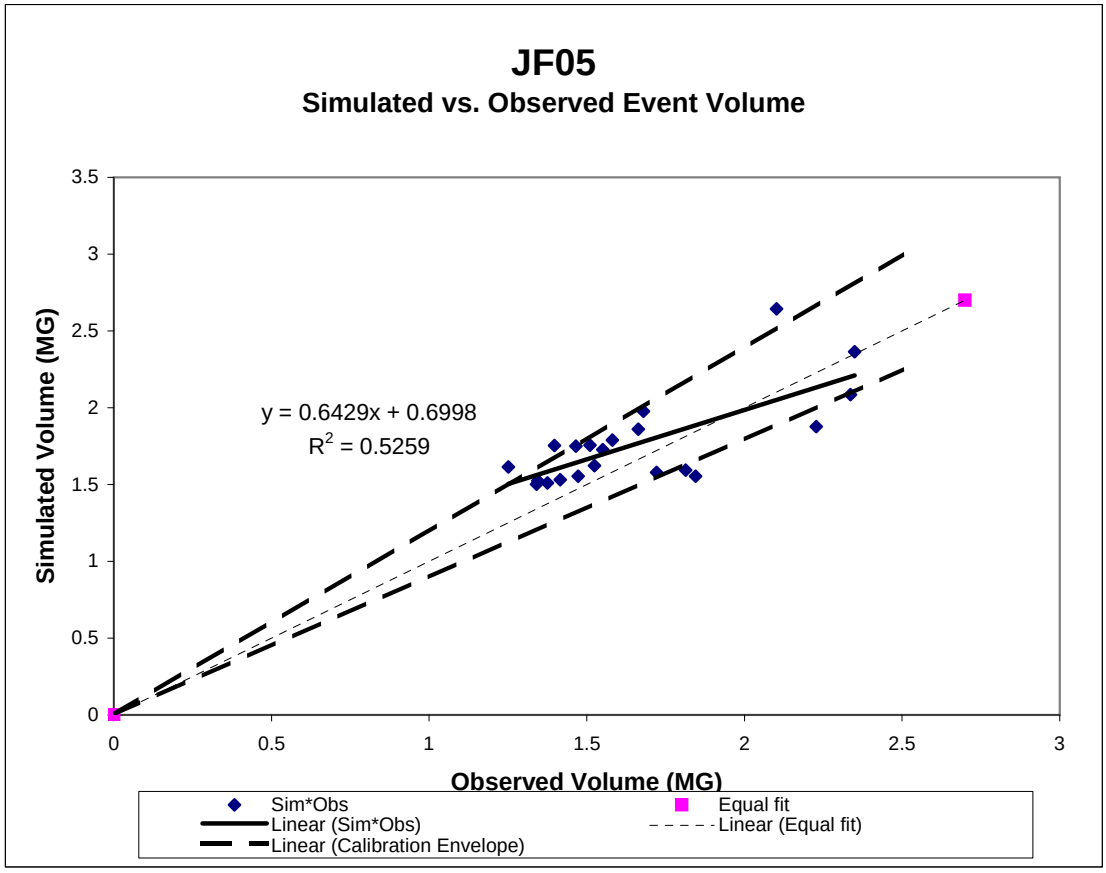

JF03_20S
Simulated vs. Observed Event Peak
y = 0.4812x + 0.4961
R2 = 0.2091
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.2
0.4
0.6
0.8
1
1.2
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

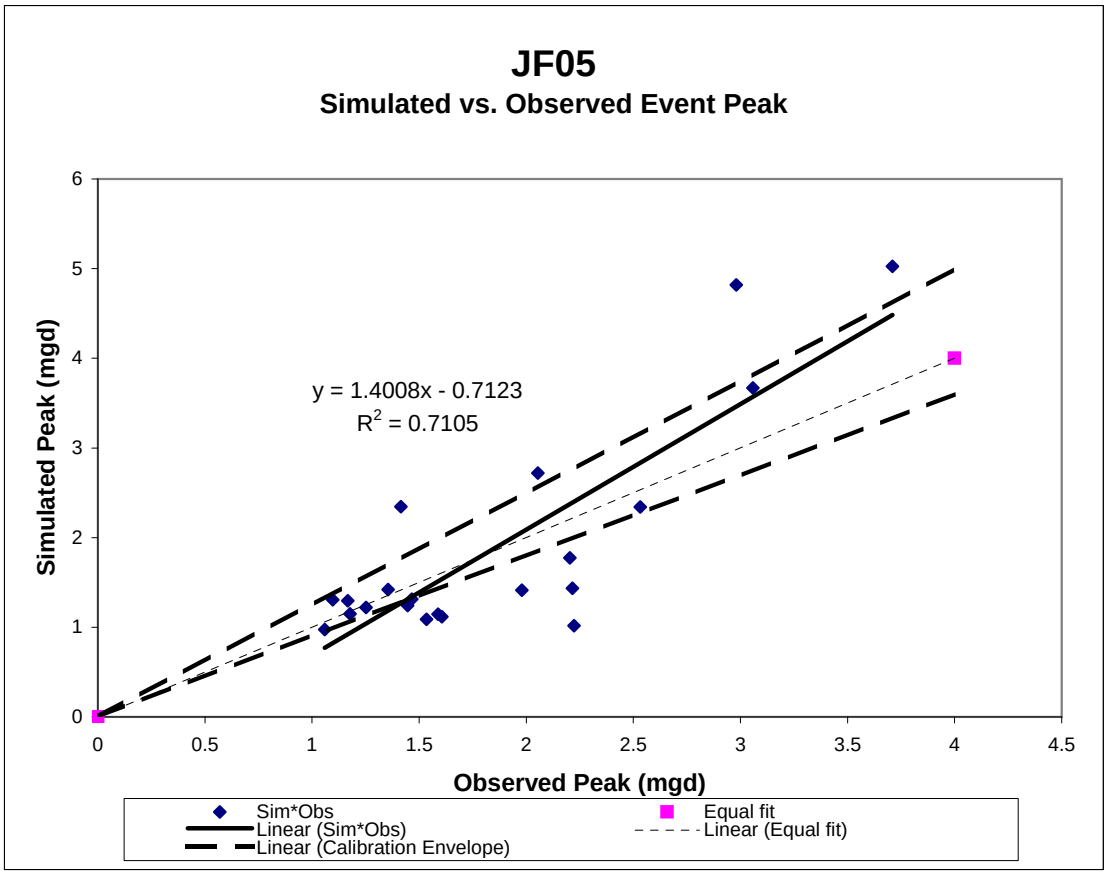
Storm Events	JF04 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.311	1.387	6%	2.392	3.156	32%	0.594	0.546	-0.048
June 1, 2006	1.259	1.192	-5%	2.811	2.135	-24%	0.818	0.448	-0.370
June 2, 2006	1.186	1.354	14%	1.857	3.267	76%	0.492	0.557	0.065
June 19, 2006	0.980	1.098	12%	1.541	1.230	-20%	0.463	0.352	-0.111
June 25, 2006	1.789	2.106	18%	3.447	5.446	58%	0.801	0.769	-0.032
July 5, 2006	1.725	1.993	16%	4.779	6.526	37%	5.698	3.803	-1.895
July 22, 2006	1.046	1.296	24%	2.830	3.427	21%	0.691	0.576	-0.115
August 7, 2006	1.003	1.111	11%	1.854	1.117	-40%	0.526	0.337	-0.189
September 1, 2006	1.413	1.442	2%	1.632	1.385	-15%	0.458	0.373	-0.085
September 5, 2006	1.417	1.568	11%	3.880	4.920	27%	3.433	0.734	-2.699
September 14, 2006	1.315	1.329	1%	1.267	1.118	-12%	0.376	0.338	-0.038
September 28, 2006	1.081	1.203	11%	3.139	1.429	-54%	1.151	0.378	-0.773
October 5, 2006	1.400	1.374	-2%	1.533	1.241	-19%	0.420	0.353	-0.067
October 17, 2006	1.252	1.226	-2%	1.575	1.204	-24%	0.427	0.348	-0.079
October 27, 2006	1.677	1.370	-18%	2.586	1.432	-45%	0.591	0.379	-0.212
November 7, 2006	2.029	1.334	-34%	2.135	1.878	-12%	0.757	0.426	-0.331
November 16, 2006	1.520	1.417	-7%	4.063	3.443	-15%	0.903	0.578	-0.325
November 22, 2006	1.373	1.109	-19%	1.436	0.919	-36%	0.452	0.315	-0.137
December 22, 2006	1.331	1.184	-11%	1.949	0.973	-50%	0.502	0.321	-0.181
January 1, 2007	1.299	1.179	-9%	1.841	1.377	-25%	0.501	0.372	-0.129
January 7, 2007	1.300	1.161	-11%	1.295	0.931	-28%	0.415	0.317	-0.098
March 1, 2007	1.263	1.219	-3%	1.739	1.205	-31%	0.496	0.348	-0.148
March 15, 2007	1.958	1.494	-24%	2.06	1.408	-32%	0.547	0.376	-0.171
April 4, 2007	1.073	1.115	4%	1.320	0.938	-29%	0.268	0.318	0.050
April 11, 2007									
April 14, 2007									


JF04
Simulated vs. Observed Event Volume
y = 0.5616x + 0.5719
R2 = 0.3964
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

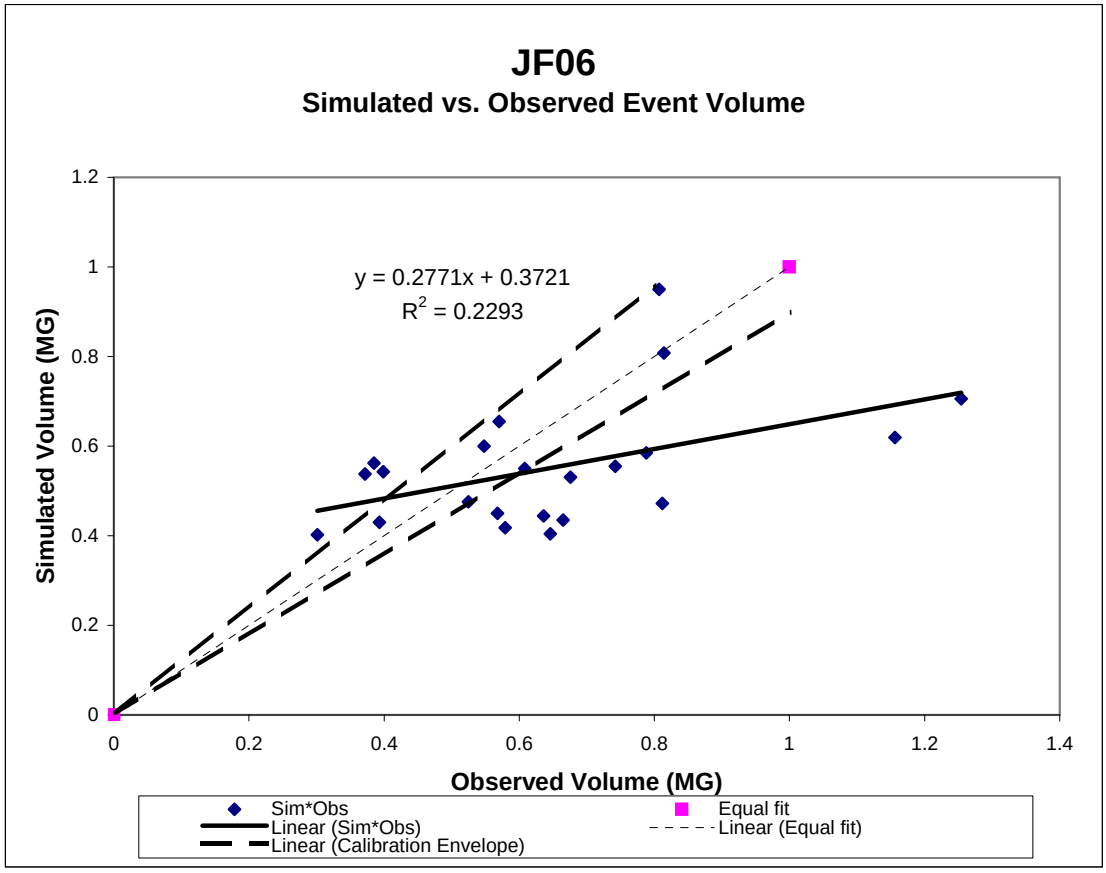

JF04
Simulated vs. Observed Event Peak
y = 1.3923x - 1.0174
R2 = 0.7228
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

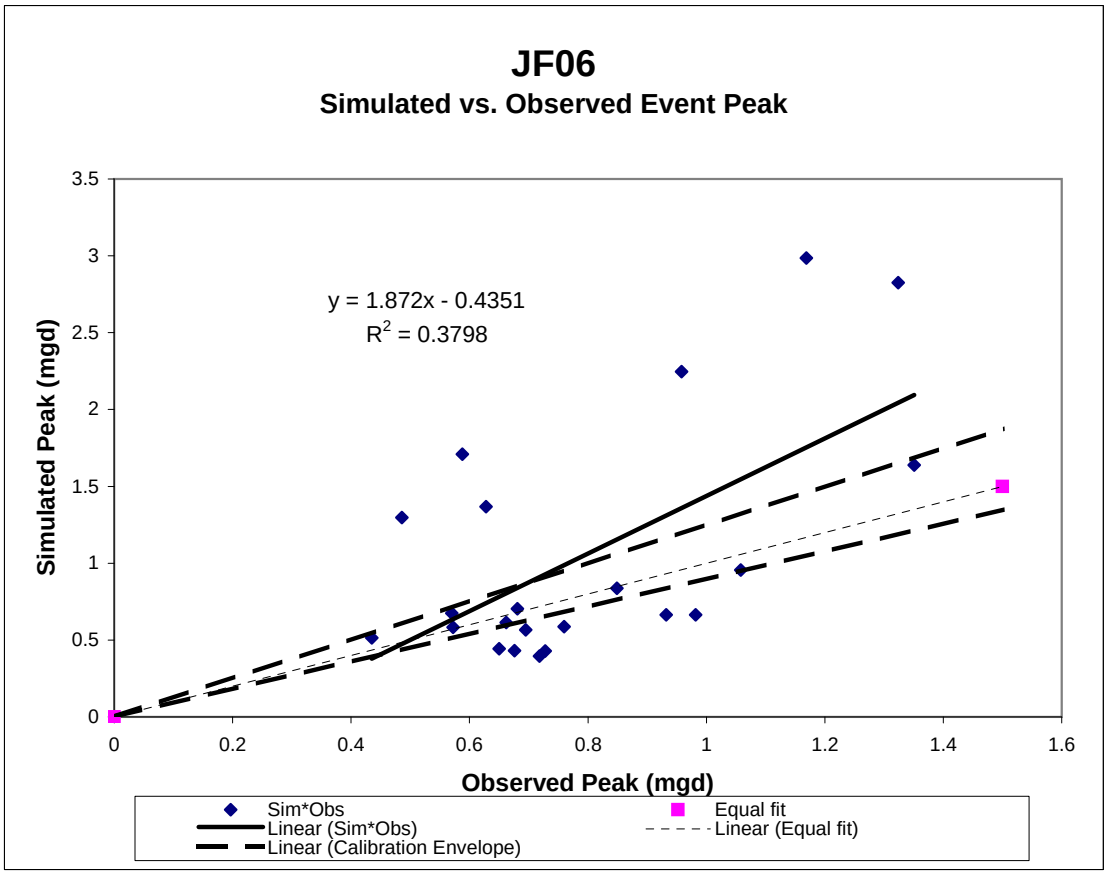
Storm Events	JF05 22-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.581	1.790	13%	2.532	2.342	-8%	0.501	0.500	-0.001
June 1, 2006	1.473	1.554	5%	1.980	1.414	-29%	0.570	0.399	-0.171
June 2, 2006	1.465	1.749	19%	1.415	2.346	66%	0.452	0.500	0.048
June 19, 2006	1.375	1.511	10%	1.177	1.151	-2%	0.403	0.373	-0.030
June 25, 2006	2.102	2.644	26%	2.980	4.817	62%	0.648	0.694	0.046
July 5, 2006	2.349	2.365	1%	3.710	5.024	35%	0.747	0.712	-0.035
July 22, 2006	1.510	1.756	16%	2.054	2.721	32%	0.572	0.529	-0.043
August 7, 2006	1.345	1.524	13%	1.588	1.147	-28%	0.477	0.373	-0.104
September 1, 2006	1.663	1.860	12%	1.355	1.420	5%	0.451	0.400	-0.051
September 5, 2006	1.680	1.978	18%	3.058	3.668	20%	0.727	0.615	-0.112
September 14, 2006	1.551	1.728	11%	1.252	1.220	-3%	0.425	0.380	-0.045
September 28, 2006	1.251	1.615	29%	1.096	1.308	19%	0.412	0.389	-0.023
October 5, 2006	1.398	1.755	26%	1.167	1.296	11%	0.430	0.388	-0.042
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006	1.814	1.593	-12%	1.606	1.116	-31%	0.436	0.369	-0.067
January 1, 2007	1.721	1.579	-8%	1.465	1.312	-10%	0.417	0.389	-0.028
January 7, 2007	1.845	1.555	-16%	1.535	1.090	-29%	0.430	0.366	-0.064
March 1, 2007	1.524	1.622	6%	1.446	1.242	-14%	0.436	0.383	-0.053
March 15, 2007	2.228	1.878	-16%	2.215	1.435	-35%	0.548	0.401	-0.147
April 4, 2007	1.341	1.503	12%	1.060	0.974	-8%	0.342	0.351	0.009
April 11, 2007	1.416	1.532	8%	2.223	1.018	-54%	0.530	0.357	-0.173
April 14, 2007	2.336	2.085	-11%	2.204	1.775	-19%	0.532	0.439	-0.093


JF05
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.6429x + 0.6998
R2 = 0.5259
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

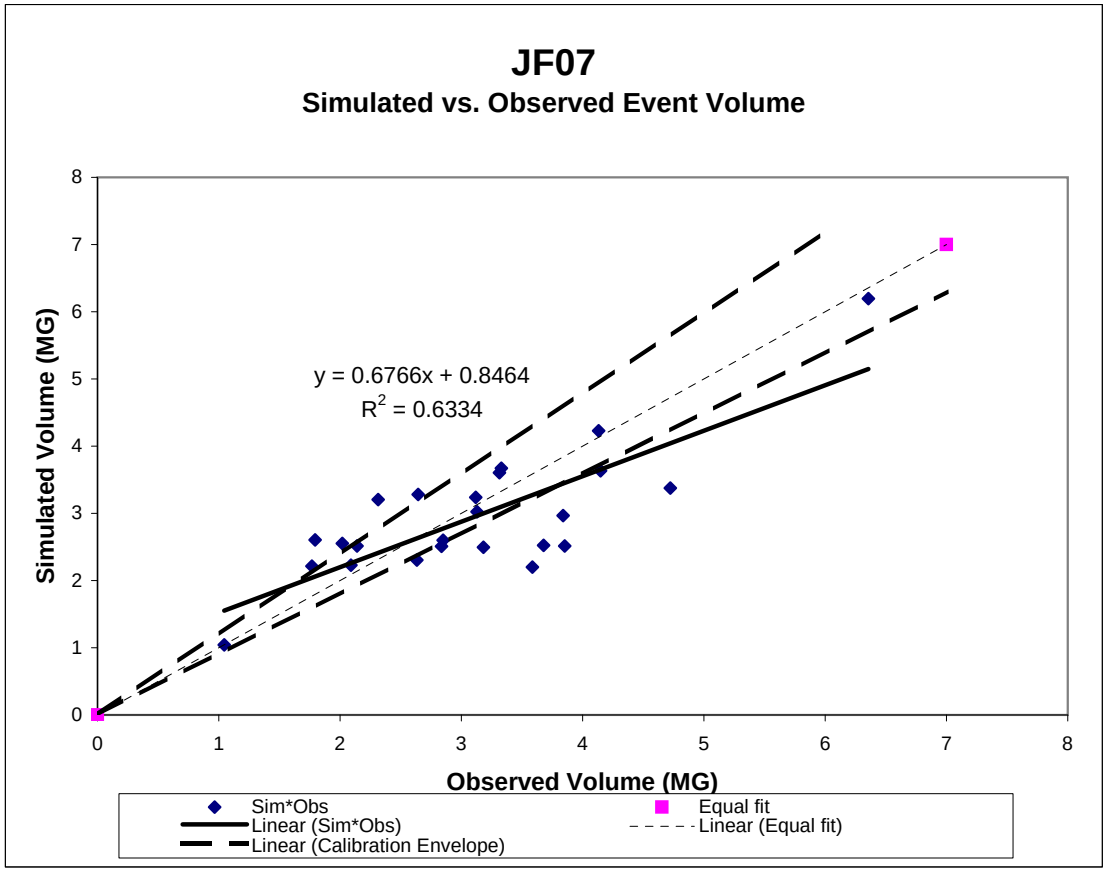

JF05
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.4008x - 0.7123
R2 = 0.7105
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

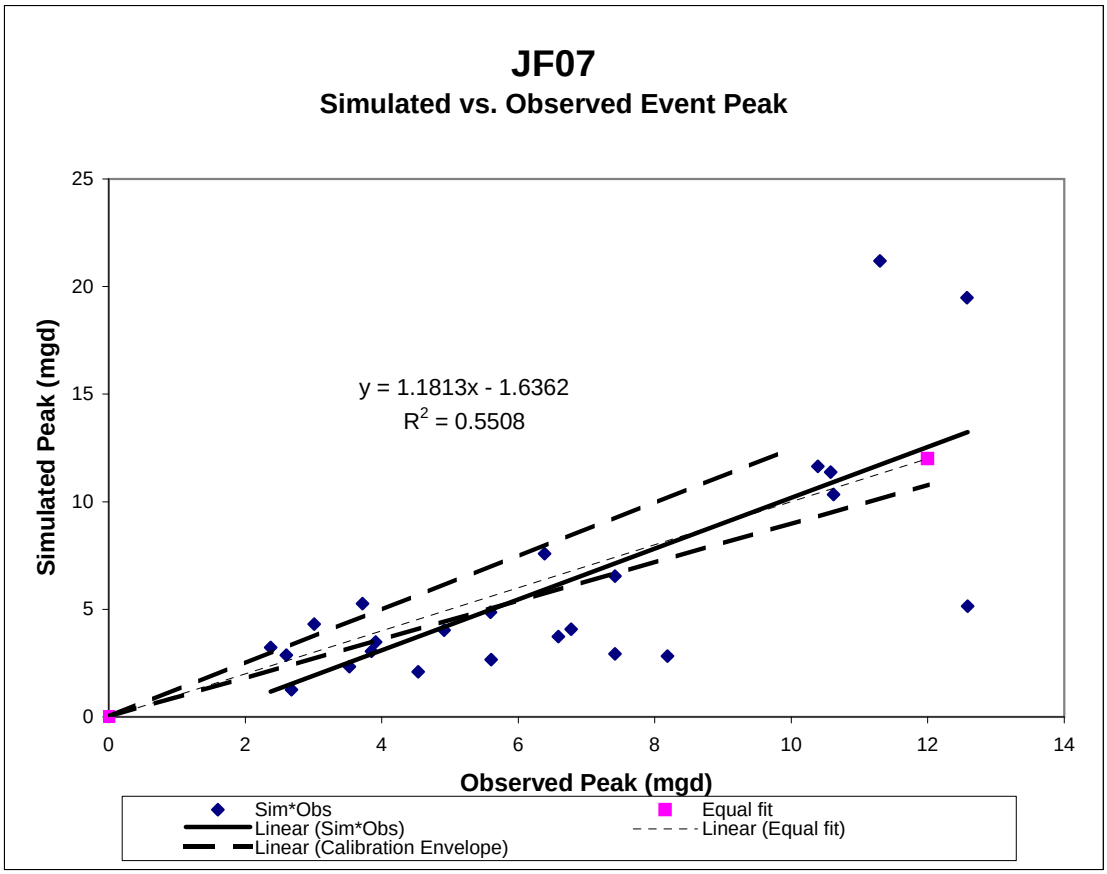
Storm Events	JF06 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.385	0.562	46%	0.628	1.368	118%	0.329	0.531	0.202
June 1, 2006	0.393	0.430	9%	0.681	0.703	3%	0.347	0.371	0.024
June 2, 2006	0.372	0.538	45%	0.486	1.298	167%	0.289	0.518	0.229
June 19, 2006	0.301	0.402	34%	0.435	0.514	18%	0.260	0.322	0.062
June 25, 2006	0.807	0.950	18%	1.169	2.986	155%	1.000	0.472	-0.528
July 5, 2006	0.814	0.808	-1%	1.324	2.825	113%	0.508	1.017	0.509
July 22, 2006	0.399	0.543	36%	0.588	1.709	191%	0.313	0.604	0.291
August 7, 2006									
September 1, 2006	0.548	0.600	9%	0.570	0.674	18%	0.369	0.364	-0.005
September 5, 2006	0.570	0.655	15%	0.958	2.246	134%	0.495	0.746	0.251
September 14, 2006									
September 28, 2006									
October 5, 2006	0.608	0.550	-10%	0.572	0.584	2%	0.398	0.343	-0.055
October 17, 2006	0.525	0.476	-9%	0.695	0.567	-18%	0.375	0.338	-0.037
October 27, 2006	0.742	0.555	-25%	0.932	0.665	-29%	0.422	0.362	-0.060
November 7, 2006	0.676	0.531	-21%	0.849	0.838	-1%	0.403	0.411	0.008
November 16, 2006	0.788	0.585	-26%	1.351	1.639	21%	0.542	0.588	0.046
November 22, 2006	0.646	0.404	-37%	0.718	0.396	-45%	0.415	0.280	-0.135
December 22, 2006	0.568	0.450	-21%	0.728	0.428	-41%	0.388	0.291	-0.097
January 1, 2007	0.636	0.444	-30%	0.662	0.615	-7%	0.370	0.351	-0.019
January 7, 2007	0.665	0.435	-35%	0.676	0.430	-36%	0.377	0.292	-0.085
March 1, 2007	0.812	0.472	-42%	0.76	0.587	-23%	0.405	0.344	-0.061
March 15, 2007	1.156	0.619	-46%	0.982	0.664	-32%	0.47	0.362	-0.108
April 4, 2007									
April 11, 2007	0.579	0.418	-28%	0.650	0.444	-32%	0.409	0.297	-0.112
April 14, 2007	1.254	0.706	-44%	1.058	0.955	-10%	0.483	0.439	-0.044


JF06
Simulated vs. Observed Event Volume
y = 0.2771x + 0.3721
R2 = 0.2293
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

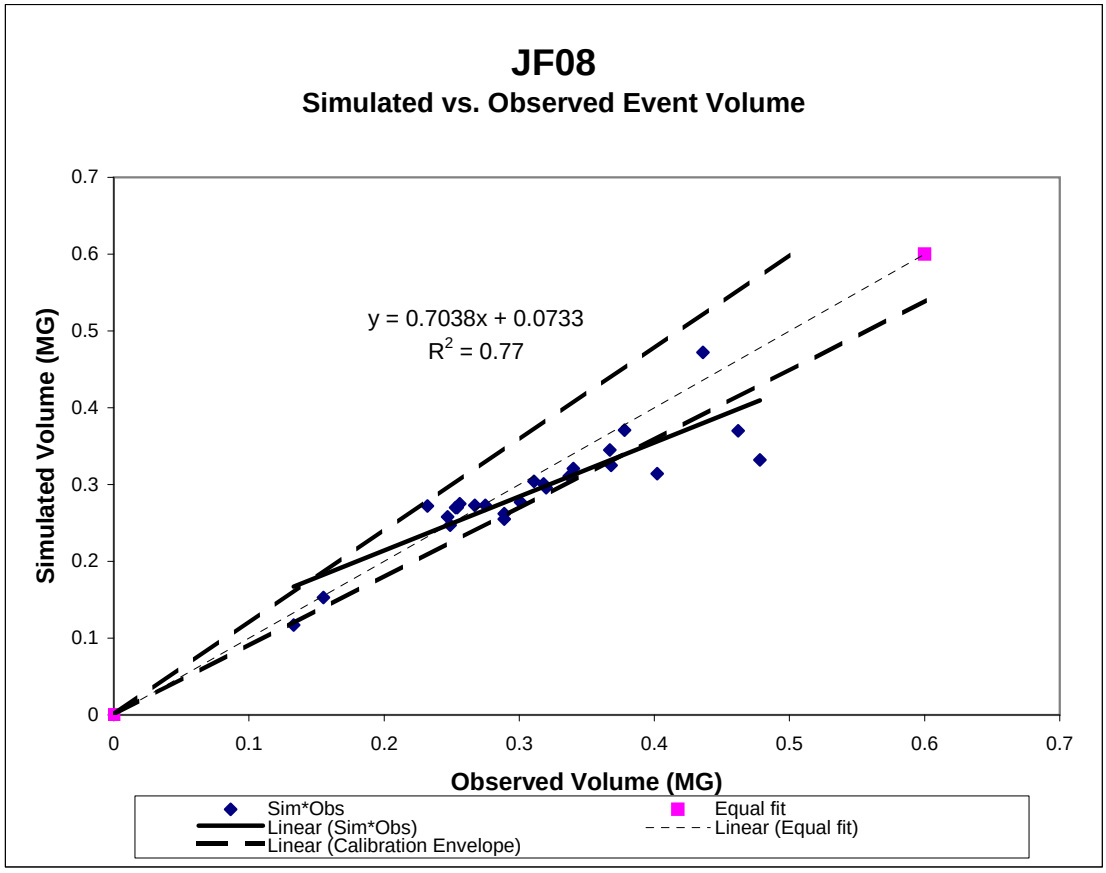

JF06
Simulated vs. Observed Event Peak
y = 1.872x - 0.4351
R2 = 0.3798
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
0.2
0.4
0.6
0.8
1.2
1.4
1.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

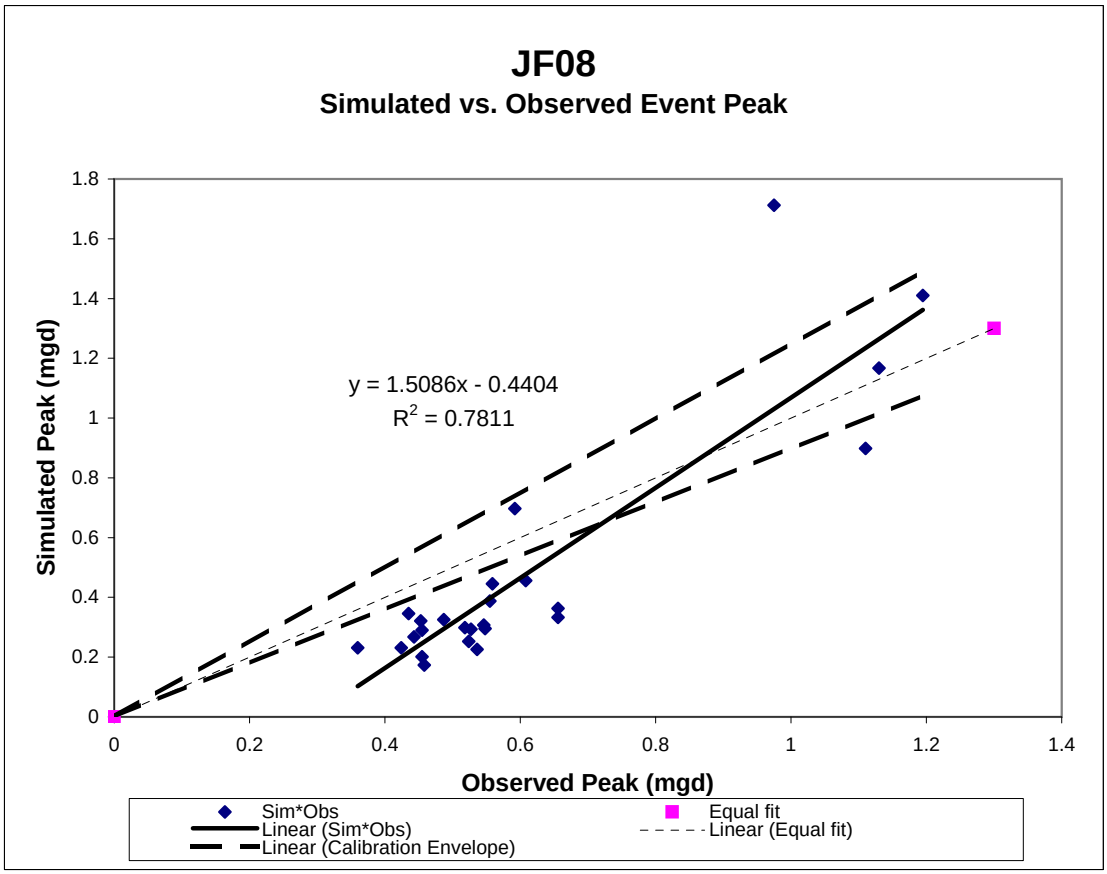
Storm Events	JF07 42-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.315	3.207	39%	10.618	10.338	-3%	3.599	3.438	-0.161
June 1, 2006	1.045	1.043	0%	2.679	1.269	-53%	2.613	2.253	-0.360
June 2, 2006	2.019	2.551	26%	6.386	7.581	19%	3.614	3.357	-0.257
June 19, 2006									
June 25, 2006	6.356	6.197	-3%	11.301	21.196	88%	4.771	6.355	1.584
July 5, 2006	4.132	4.228	2%	12.576	19.485	55%	4.166	3.630	-0.536
July 22, 2006	1.795	2.606	45%	3.718	5.267	42%	4.057	6.123	2.066
August 7, 2006	1.767	2.212	25%	2.603	2.875	10%	2.699	3.062	0.363
September 1, 2006	3.313	3.607	9%	6.776	4.082	-40%	4.216	5.336	1.120
September 5, 2006	3.331	3.670	10%	10.390	11.648	12%	5.304	11.723	6.419
September 14, 2006	3.129	3.023	-3%	3.849	3.054	-21%	4.006	3.721	-0.285
September 28, 2006	2.141	2.512	17%	4.915	4.029	-18%	3.578	4.568	0.990
October 5, 2006	3.118	3.240	4%	3.911	3.474	-11%	4.074	4.773	0.699
October 17, 2006	2.850	2.600	-9%	6.589	3.736	-43%	4.248	4.774	0.526
October 27, 2006	2.643	3.281	24%	12.585	5.148	-59%	4.761	6.032	1.271
November 7, 2006	3.838	2.968	-23%	7.416	6.543	-12%	4.586	6.898	2.312
November 16, 2006	4.723	3.376	-29%	10.579	11.375	8%	5.149	11.660	6.511
November 22, 2006	3.585	2.199	-39%	4.535	2.090	-54%	3.921	2.989	-0.932
December 22, 2006	3.677	2.526	-31%	8.186	2.832	-65%	4.256	3.426	-0.830
January 1, 2007	2.836	2.511	-11%	3.011	4.308	43%	4.166	5.479	1.313
January 7, 2007	3.181	2.494	-22%	3.527	2.335	-34%	4.191	3.361	-0.830
March 1, 2007	3.851	2.515	-35%	7.418	2.926	-61%	4.133	5.455	1.322
March 15, 2007	4.148	3.633	-12%	5.592	4.869	-13%	5.236	6.181	0.945
April 4, 2007	2.090	2.230	7%	2.374	3.232	36%	3.434	2.409	-1.025
April 11, 2007	2.633	2.303	-13%	5.602	2.662	-52%	4.117	2.974	-1.143
April 14, 2007									


JF07
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.6766x + 0.8464
R2 = 0.6334
0
1
2
3
4
5
6
7
8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

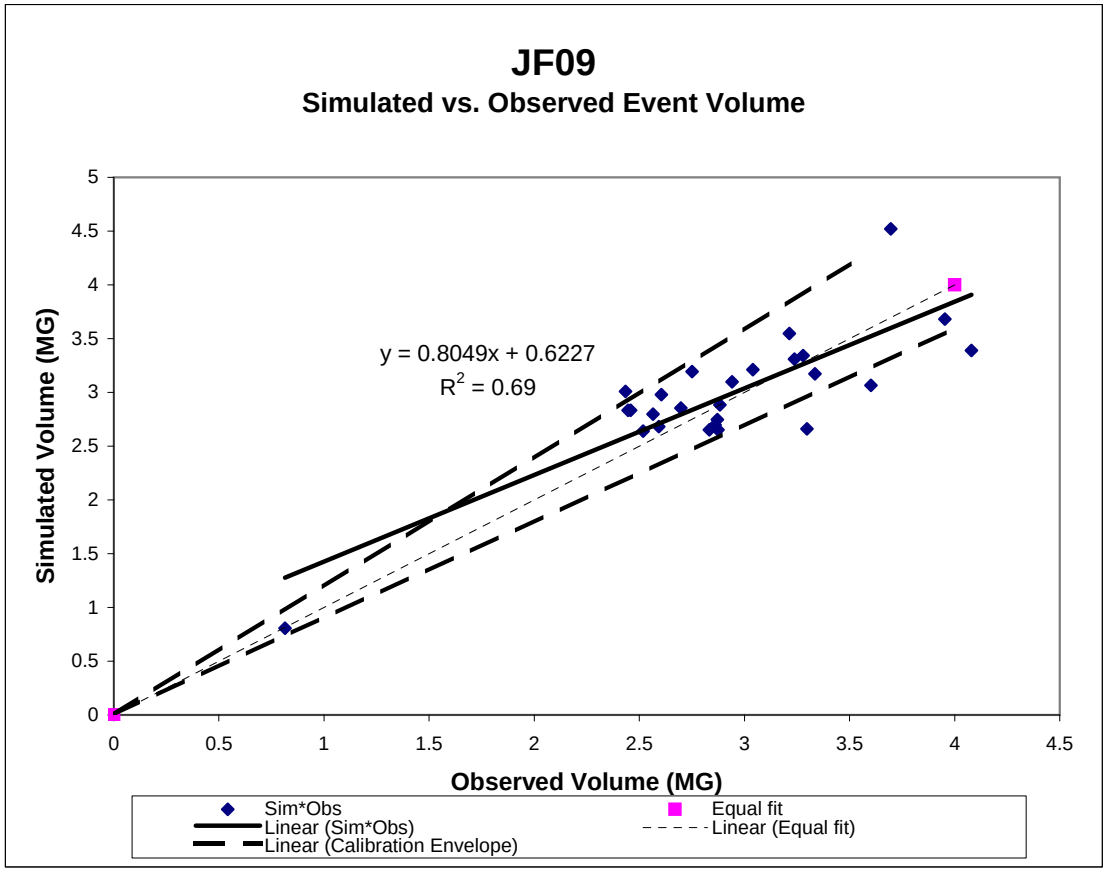

JF07
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.1813x - 1.6362
R2 = 0.5508
0
2
4
6
8
10
12
14
15
20
25
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

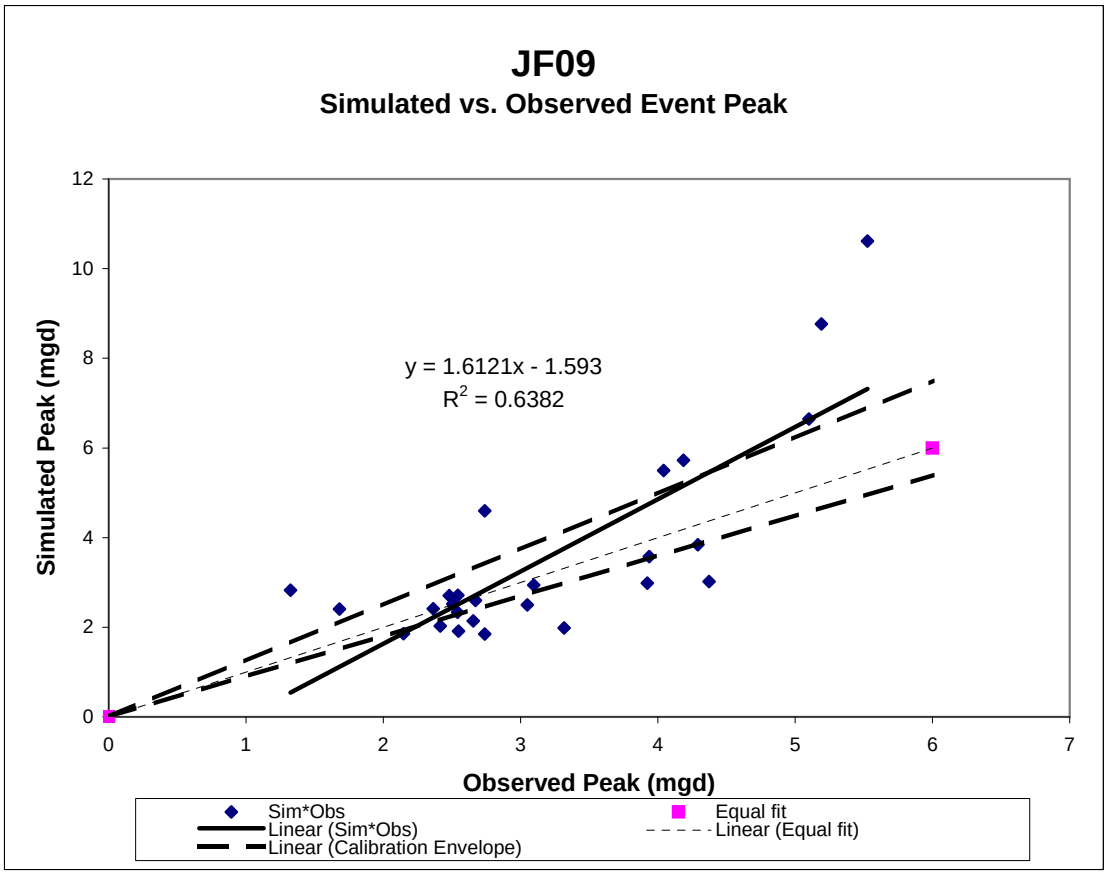
Storm Events	JF08 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.311	0.304	-2%	0.592	0.697	18%	0.257	0.296	0.039
June 1, 2006	0.133	0.117	-12%	0.458	0.174	-62%	0.225	0.177	-0.048
June 2, 2006	0.155	0.153	-1%	0.559	0.445	-20%	0.252	0.246	-0.006
June 19, 2006	0.249	0.247	-1%	0.424	0.231	-46%	0.221	0.194	-0.027
June 25, 2006	0.436	0.472	8%	0.975	1.712	76%	0.340	0.447	0.107
July 5, 2006	0.378	0.371	-2%	1.195	1.410	18%	0.369	0.409	0.040
July 22, 2006	0.253	0.270	7%	0.546	0.307	-44%	0.253	0.215	-0.038
August 7, 2006	0.289	0.255	-12%	0.518	0.299	-42%	0.252	0.213	-0.039
September 1, 2006	0.368	0.325	-12%	0.487	0.325	-33%	0.232	0.220	-0.012
September 5, 2006	0.367	0.345	-6%	1.130	1.167	3%	0.335	0.373	0.038
September 14, 2006	0.318	0.301	-5%	0.455	0.29	-36%	0.222	0.211	-0.011
September 28, 2006	0.254	0.270	6%	0.548	0.296	-46%	0.229	0.213	-0.016
October 5, 2006	0.337	0.311	-8%	0.453	0.321	-29%	0.208	0.219	0.011
October 17, 2006	0.301	0.277	-8%	0.443	0.268	-40%	0.212	0.204	-0.008
October 27, 2006	0.402	0.314	-22%	0.656	0.333	-49%	0.248	0.222	-0.026
November 7, 2006	0.32	0.296	-8%	0.555	0.388	-30%	0.231	0.235	0.004
November 16, 2006	0.340	0.321	-6%	1.110	0.898	-19%	0.335	0.330	-0.005
November 22, 2006	0.247	0.258	4%	0.455	0.201	-56%	0.212	0.184	-0.028
December 22, 2006	0.232	0.272	17%	0.536	0.226	-58%	0.223	0.192	-0.031
January 1, 2007	0.256	0.275	7%	0.435	0.346	-20%	0.21	0.225	0.015
January 7, 2007	0.275	0.273	-1%	0.524	0.253	-52%	0.235	0.2	-0.035
March 1, 2007	0.267	0.273	2%	0.527	0.293	-44%	0.246	0.212	-0.034
March 15, 2007	0.478	0.332	-31%	0.656	0.363	-45%	0.255	0.229	-0.026
April 4, 2007	0.289	0.262	-9%	0.360	0.231	-36%	0.201	0.194	-0.007
April 11, 2007									
April 14, 2007	0.462	0.37	-20%	0.608	0.456	-25%	0.265	0.248	-0.017


JF08
Simulated vs. Observed Event Volume
y = 0.7038x + 0.0733
R2 = 0.77
Simulated Volume (MG)
Observed Volume (MG)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

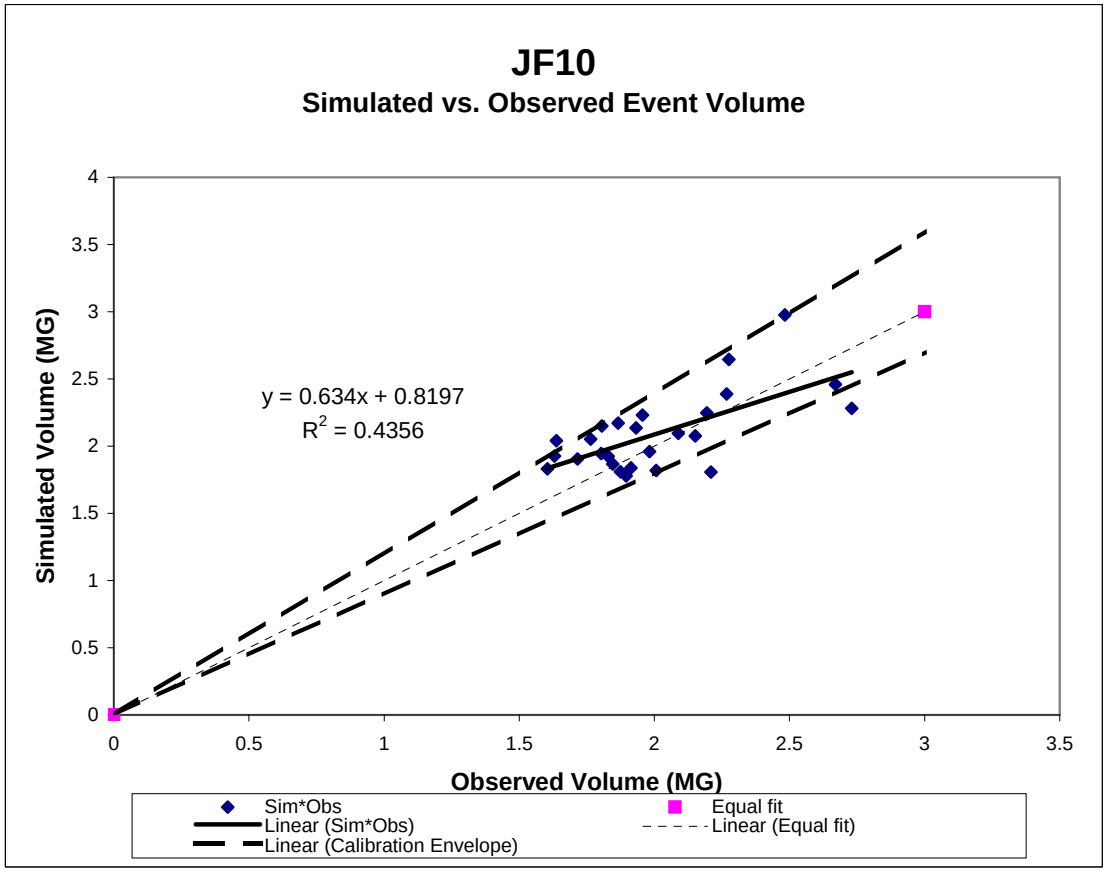

JF08
Simulated vs. Observed Event Peak
y = 1.5086x - 0.4404
R2 = 0.7811
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

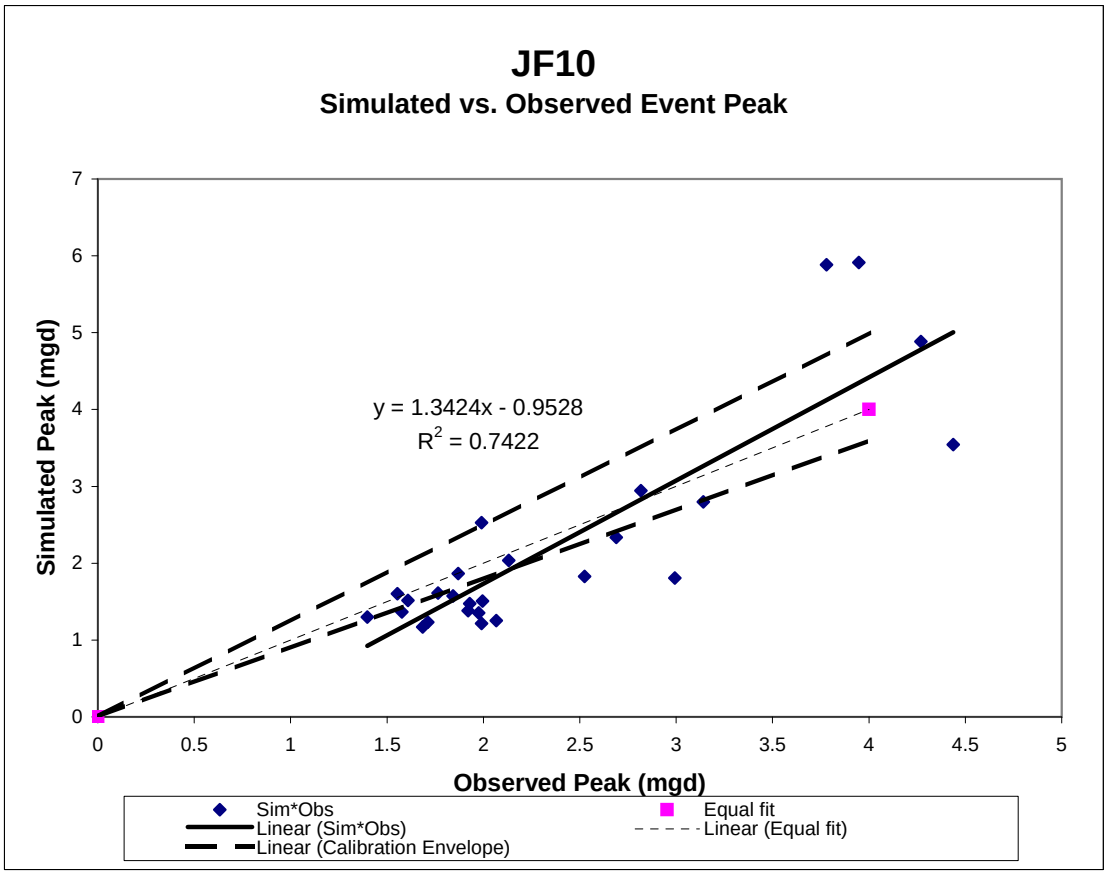
Storm Events	JF09 21-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	3.040	3.212	6%	4.187	5.727	37%	2.520	2.113	-0.407
June 1, 2006	2.874	2.653	-8%	2.738	1.850	-32%	2.052	0.935	-1.117
June 2, 2006	2.604	2.980	14%	2.738	4.598	68%	2.052	1.631	-0.421
June 19, 2006	2.833	2.651	-6%	2.672	2.602	-3%	1.643	1.114	-0.529
June 25, 2006	3.696	4.520	22%	5.527	10.616	92%	3.507	4.959	1.452
July 5, 2006	0.814	0.808	-1%	1.324	2.825	113%	0.508	1.017	0.509
July 22, 2006	2.434	3.008	24%	4.041	5.497	36%	2.821	2.010	-0.811
August 7, 2006	2.593	2.683	3%	1.681	2.404	43%	1.033	1.069	0.036
September 1, 2006	3.279	3.341	2%	3.095	2.938	-5%	1.894	1.188	-0.706
September 5, 2006	3.213	3.547	10%	5.190	8.769	69%	3.685	3.661	-0.024
September 14, 2006	2.941	3.099	5%	2.363	2.410	2%	1.512	1.066	-0.446
September 28, 2006	2.447	2.832	16%	2.543	2.715	7%	1.870	1.142	-0.728
October 5, 2006	2.751	3.194	16%	2.505	2.522	1%	1.704	1.091	-0.613
October 17, 2006	2.883	2.883	0%	3.050	2.500	-18%	1.810	1.086	-0.724
October 27, 2006	3.335	3.173	-5%	4.373	3.021	-31%	2.525	1.206	-1.319
November 7, 2006	3.602	3.064	-15%	3.936	3.579	-9%	2.198	1.339	-0.859
November 16, 2006	3.238	3.311	2%	5.101	6.649	30%	3.854	2.556	-1.298
November 22, 2006	3.297	2.662	-19%	2.547	1.913	-25%	1.567	0.950	-0.617
December 22, 2006	2.458	2.834	15%	2.655	2.142	-19%	1.676	1.003	-0.673
January 1, 2007	2.565	2.799	9%	2.481	2.709	9%	1.666	1.138	-0.528
January 7, 2007	2.871	2.748	-4%	2.416	2.025	-16%	1.467	0.976	-0.491
March 1, 2007	2.697	2.854	6%	2.541	2.336	-8%	0.738	0.715	-0.023
March 15, 2007	4.08	3.39	-17%	3.924	2.982	-24%	2.705	1.198	-1.507
April 4, 2007	2.518	2.640	5%	2.148	1.853	-14%	1.504	0.939	-0.565
April 11, 2007	2.861	2.696	-6%	3.316	1.983	-40%	2.009	0.967	-1.042
April 14, 2007	3.953	3.681	-7%	4.291	3.840	-11%	2.963	1.401	-1.562


JF09
Simulated vs. Observed Event Volume
y = 0.8049x + 0.6227
R2 = 0.69
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

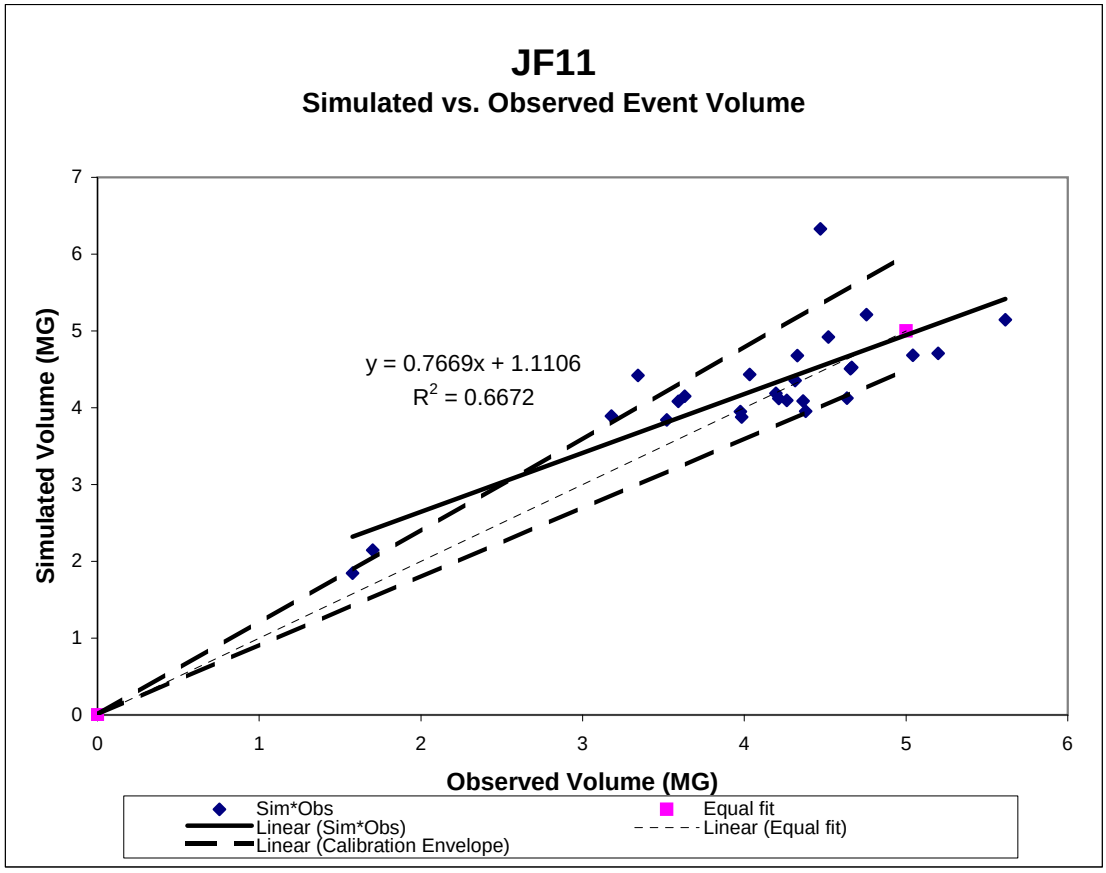

JF09
Simulated vs. Observed Event Peak
y = 1.6121x - 1.593
R2 = 0.6382
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
8
10
12
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

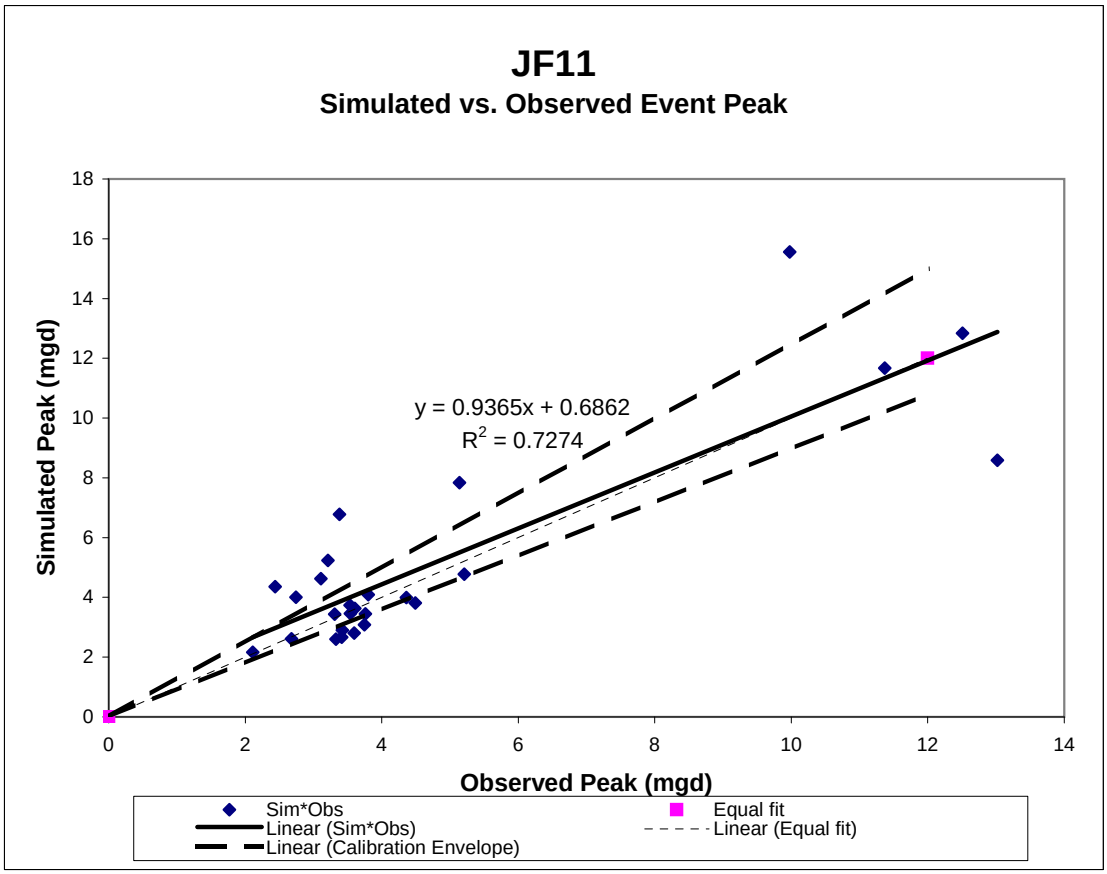
Storm Events	JF10 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.866	2.171	16%	2.817	2.946	5%	0.937	0.820	-0.117
June 1, 2006	1.896	1.779	-6%	1.991	1.217	-39%	0.746	0.518	-0.228
June 2, 2006	1.637	2.041	25%	1.991	2.526	27%	0.746	0.757	0.011
June 19, 2006	1.874	1.810	-3%	1.577	1.367	-13%	0.642	0.550	-0.092
June 25, 2006	2.483	2.976	20%	3.780	5.886	56%	1.616	4.141	2.525
July 5, 2006	2.276	2.646	16%	3.948	5.913	50%	1.811	3.096	1.285
July 22, 2006	1.764	2.053	16%	3.141	2.799	-11%	1.021	0.799	-0.222
August 7, 2006	1.604	1.831	14%	1.920	1.382	-28%	0.663	0.553	-0.110
September 1, 2006	2.194	2.247	2%	1.870	1.864	0%	0.655	0.646	-0.009
September 5, 2006	2.267	2.389	5%	4.269	4.885	14%	1.613	1.721	0.108
September 14, 2006	2.089	2.095	0%	1.608	1.514	-6%	0.733	0.580	-0.153
September 28, 2006	1.829	1.924	5%	1.929	1.476	-23%	0.834	0.572	-0.262
October 5, 2006	1.806	2.149	19%	1.554	1.603	3%	0.743	0.597	-0.146
October 17, 2006	1.982	1.960	-1%	1.842	1.574	-15%	0.745	0.592	-0.153
October 27, 2006	1.932	2.136	11%	2.993	1.808	-40%	1.031	0.636	-0.395
November 7, 2006	2.151	2.077	-3%	2.131	2.036	-4%	0.970	0.677	-0.293
November 16, 2006	1.956	2.231	14%	4.438	3.543	-20%	1.722	0.966	-0.756
November 22, 2006	2.007	1.819	-9%	1.711	1.233	-28%	0.780	0.521	-0.259
December 22, 2006	1.631	1.927	18%	1.975	1.354	-31%	0.844	0.547	-0.297
January 1, 2007	1.716	1.905	11%	1.764	1.610	-9%	0.777	0.599	-0.178
January 7, 2007	1.846	1.867	1%	1.397	1.301	-7%	0.700	0.536	-0.164
March 1, 2007	1.803	1.946	8%	1.995	1.506	-25%	0.679	0.578	-0.101
March 15, 2007	2.73	2.282	-16%	2.525	1.827	-28%	0.822	0.639	-0.183
April 4, 2007	2.209	1.808	-18%	1.685	1.169	-31%	0.635	0.507	-0.128
April 11, 2007	1.913	1.837	-4%	2.066	1.254	-39%	0.782	0.526	-0.256
April 14, 2007	2.670	2.459	-8%	2.690	2.337	-13%	0.895	0.727	-0.168


JF10
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.634x + 0.8197
R2 = 0.4356
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

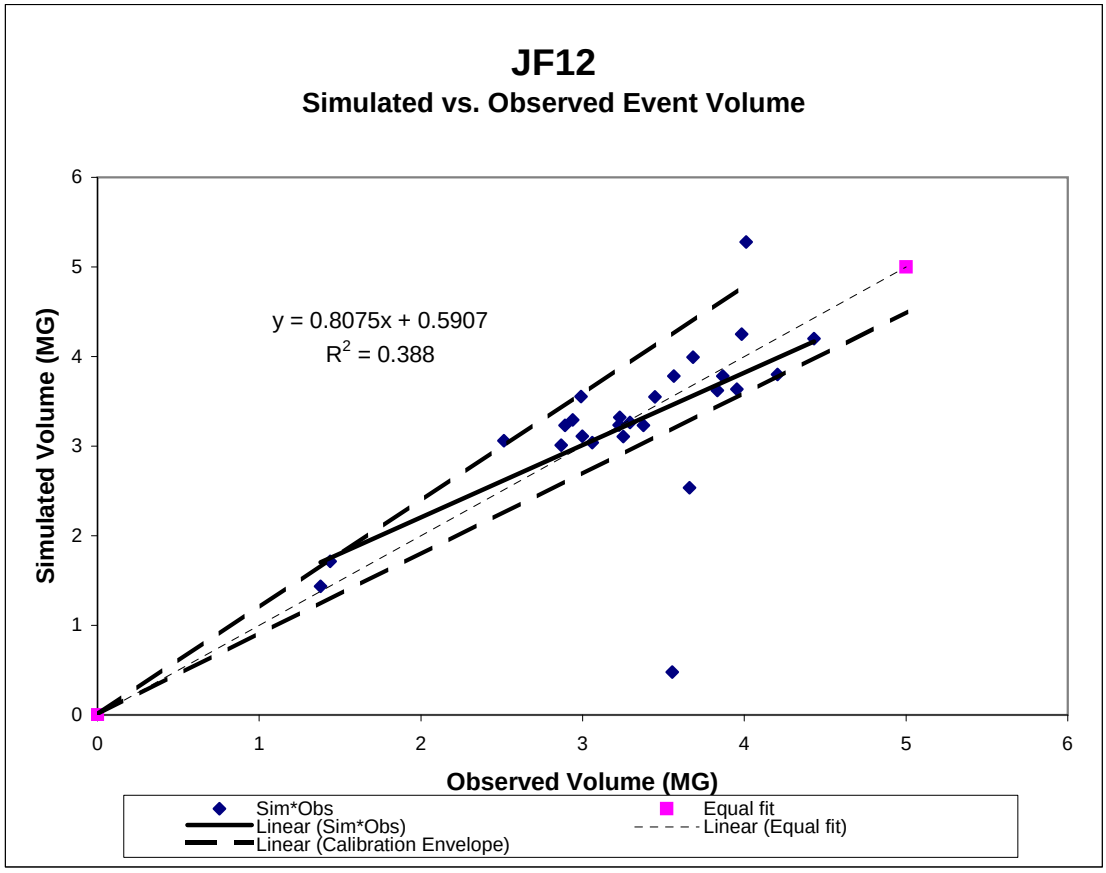

JF10
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.3424x - 0.9528
R2 = 0.7422
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

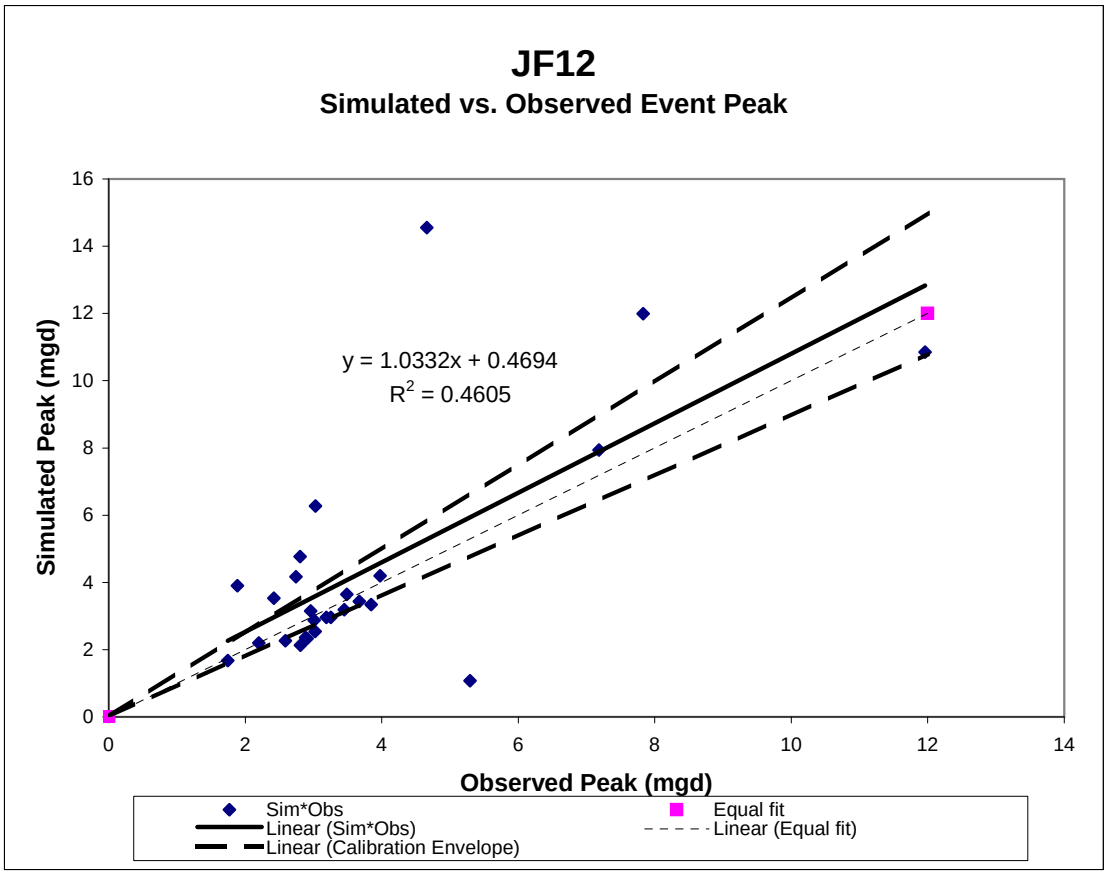
Storm Events	JF11 24-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	3.343	4.422	32%	5.139	7.836	52%	0.795	0.951	0.156
June 1, 2006	1.578	1.846	17%	2.112	2.168	3%	0.419	0.402	-0.017
June 2, 2006	1.702	2.145	26%	3.107	4.624	49%	0.558	0.632	0.074
June 19, 2006	3.179	3.891	22%	2.439	4.363	79%	0.477	0.614	0.137
June 25, 2006	4.470	6.330	42%	9.979	15.560	56%	2.509	3.736	1.227
July 5, 2006	4.756	5.213	10%	12.511	12.836	3%	2.391	2.430	0.039
July 22, 2006	3.591	4.082	14%	3.380	6.778	101%	0.633	0.846	0.213
August 7, 2006	3.521	3.84	9%	2.744	4.006	46%	0.504	0.588	0.084
September 1, 2006	4.327	4.681	8%	3.536	3.737	6%	0.582	0.561	-0.021
September 5, 2006	4.520	4.921	9%	11.368	11.674	3%	1.692	1.543	-0.149
September 14, 2006	4.032	4.434	10%	3.311	3.435	4%	0.553	0.528	-0.025
September 28, 2006	3.631	4.150	14%	3.213	5.238	63%	0.553	0.692	0.139
October 5, 2006	4.664	4.527	-3%	3.541	3.456	-2%	0.565	0.530	-0.035
October 17, 2006	4.196	4.187	0%	3.758	3.453	-8%	0.576	0.529	-0.047
October 27, 2006	4.657	4.509	-3%	4.491	3.815	-15%	0.64	0.569	-0.071
November 7, 2006	4.313	4.356	1%	3.804	4.086	7%	0.595	0.595	0.000
November 16, 2006	5.043	4.685	-7%	13.020	8.590	-34%	1.594	1.055	-0.539
November 22, 2006	4.379	3.954	-10%	3.330	2.602	-22%	0.534	0.455	-0.079
December 22, 2006	4.214	4.121	-2%	3.595	2.806	-22%	0.55	0.475	-0.075
January 1, 2007	4.263	4.095	-4%	3.607	3.627	1%	0.554	0.549	-0.005
January 7, 2007	4.363	4.089	-6%	3.422	2.897	-15%	0.529	0.483	-0.046
March 1, 2007	4.634	4.123	-11%	3.747	3.085	-18%	0.547	0.498	-0.049
March 15, 2007	5.199	4.710	-9%	4.359	3.996	-8%	0.646	0.587	-0.059
April 4, 2007	3.984	3.880	-3%	2.679	2.618	-2%	0.453	0.456	0.003
April 11, 2007	3.975	3.948	-1%	3.411	2.665	-22%	0.533	0.462	-0.071
April 14, 2007	5.614	5.147	-8%	5.207	4.771	-8%	0.697	0.644	-0.053


JF11
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.7669x + 1.1106
R2 = 0.6672
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

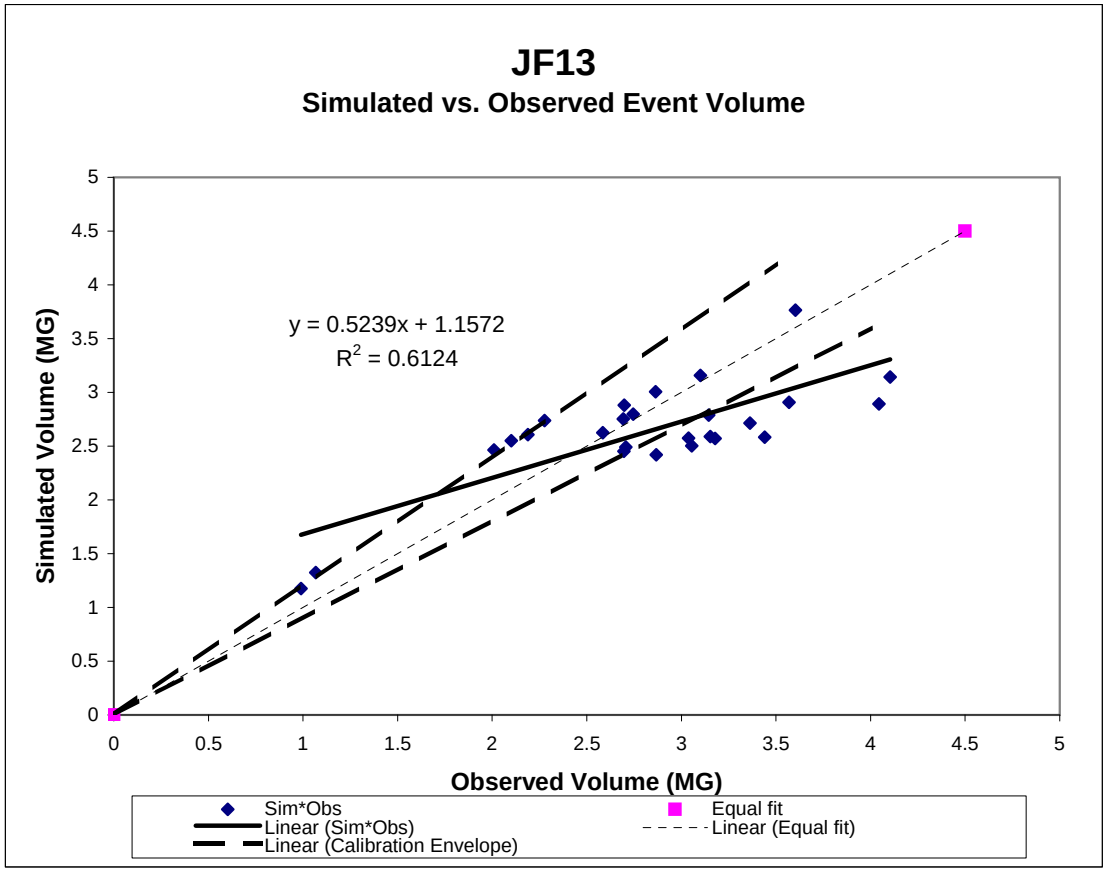

JF11
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.9365x + 0.6862
R2 = 0.7274
0
2
4
6
8
10
12
14
16
18
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

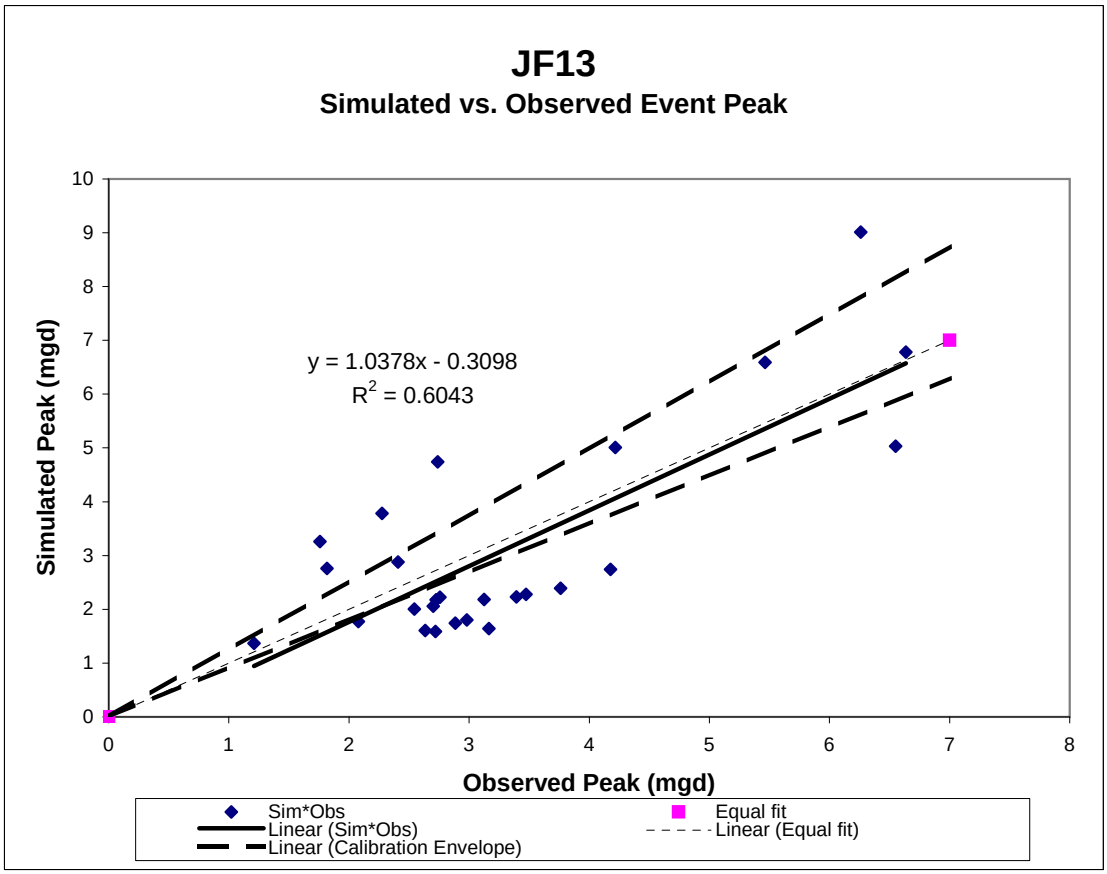
	JF12 24-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.99	3.552	19%	5.295	1.073	-80%	0.825	0.838	0.013
June 1, 2006	1.380	1.435	4%	1.742	1.674	-4%	0.380	0.401	0.021
June 2, 2006	1.439	1.715	19%	2.742	4.173	52%	0.542	0.612	0.070
June 19, 2006	2.513	3.059	22%	1.883	3.904	107%	0.447	0.588	0.141
June 25, 2006	4.011	5.277	32%	4.661	14.551	212%	5.092	6.702	1.610
July 5, 2006	3.984	4.250	7%	7.830	11.991	53%	5.153	2.384	-2.769
July 22, 2006	2.892	3.232	12%	3.030	6.275	107%	0.551	0.773	0.222
August 7, 2006	2.867	3.012	5%	2.419	3.532	46%	0.462	0.554	0.092
September 1, 2006	3.563	3.781	6%	3.453	3.188	-8%	0.594	0.529	-0.065
September 5, 2006	3.682	3.993	8%	11.960	10.846	-9%	4.813	1.355	-3.458
September 14, 2006	3.448	3.549	3%	3.253	2.957	-9%	0.574	0.515	-0.059
September 28, 2006	2.939	3.294	12%	2.803	4.773	70%	0.536	0.651	0.115
October 5, 2006	3.953	3.635	-8%	3.012	2.875	-5%	0.539	0.510	-0.029
October 17, 2006	3.23	3.322	3%	3.189	2.958	-7%	0.56	0.515	-0.045
October 27, 2006	3.833	3.621	-6%	3.846	3.342	-13%	0.642	0.539	-0.103
November 7, 2006	3.555	0.477	-87%	3.487	3.641	4%	0.612	0.563	-0.049
November 16, 2006	3.866	3.782	-2%	7.184	7.937	10%	5.826	0.901	-4.925
November 22, 2006	3.251	3.108	-4%	2.808	2.129	-24%	0.510	0.444	-0.066
December 22, 2006	3.292	3.266	-1%	2.907	2.334	-20%	0.524	0.465	-0.059
January 1, 2007	3.225	3.236	0%	2.959	3.148	6%	0.525	0.527	0.002
January 7, 2007	3.375	3.233	-4%	2.884	2.357	-18%	0.513	0.467	-0.046
March 1, 2007	3.660	2.537	-31%	3.023	2.537	-16%	0.541	0.483	-0.058
March 15, 2007	4.205	3.799	-10%	3.669	3.440	-6%	0.648	0.547	-0.101
April 4, 2007	3.060	3.040	-1%	2.198	2.196	0%	0.436	0.451	0.015
April 11, 2007	2.998	3.109	4%	2.588	2.263	-13%	0.499	0.458	-0.041
April 14, 2007	4.431	4.2	-5%	3.977	4.196	6%	0.675	0.614	-0.061


JF12
Simulated vs. Observed Event Volume
y = 0.8075x + 0.5907
R2 = 0.388
Simulated Volume (MG)
Observed Volume (MG)
0
1
2
3
4
5
6
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

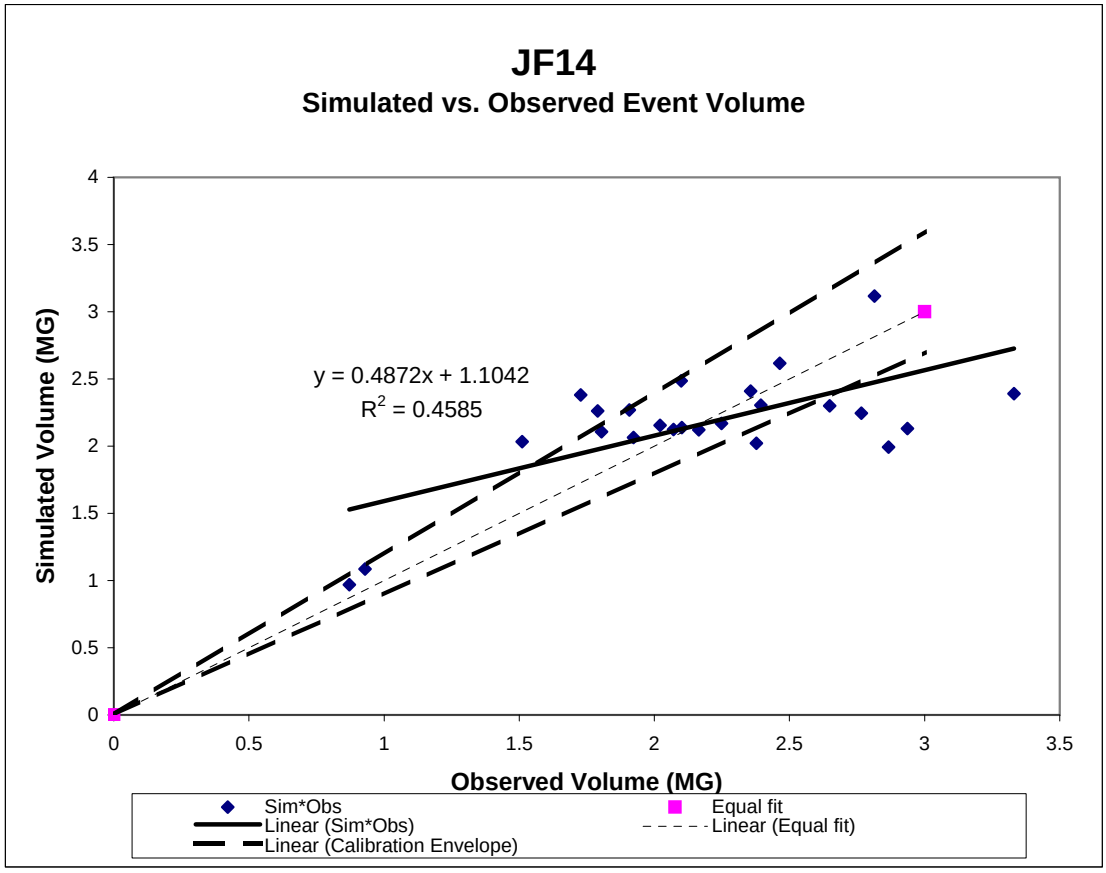

JF12
Simulated vs. Observed Event Peak
y = 1.0332x + 0.4694
R2 = 0.4605
Simulated Peak (mgd)
Observed Peak (mgd)
0
2
4
6
8
10
12
14
16
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

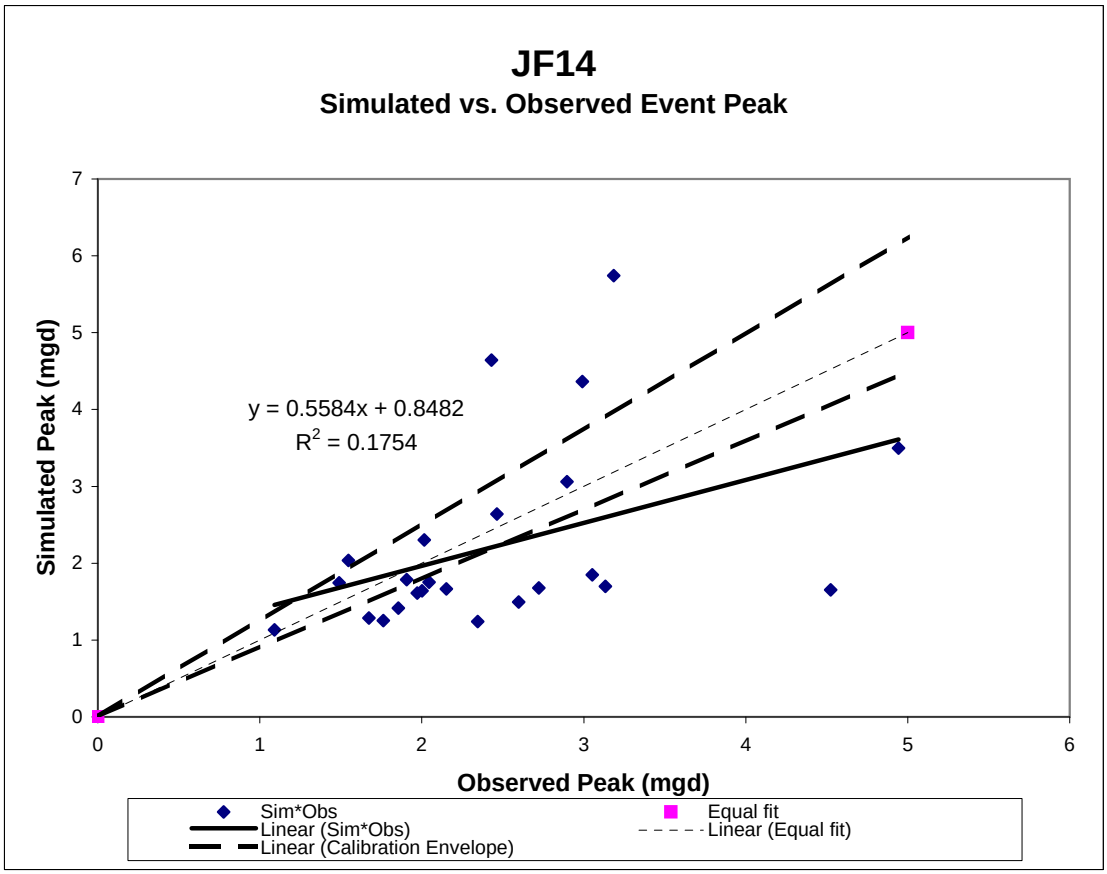
	JF13 21-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.276	2.737	20%	4.218	5.006	19%	0.751	0.81	0.059
June 1, 2006	0.990	1.176	19%	1.210	1.368	13%	0.361	0.408	0.047
June 2, 2006	1.067	1.323	24%	2.408	2.877	19%	0.555	0.594	0.039
June 19, 2006	2.01	2.464	23%	1.758	3.261	85%	0.479	0.631	0.152
June 25, 2006	3.602	3.765	5%	6.261	9.012	44%	0.930	1.600	0.670
July 5, 2006	3.100	3.159	2%	6.635	6.781	2%	1.951	0.960	-0.991
July 22, 2006	2.100	2.551	21%	2.739	4.743	73%	0.606	0.782	0.176
August 7, 2006	2.867	2.42	-16%	1.816	2.76	52%	0.469	0.584	0.115
September 1, 2006	2.698	2.880	7%	2.725	2.179	-20%	0.576	0.512	-0.064
September 5, 2006	2.863	3.005	5%	5.463	6.594	21%	0.878	0.949	0.071
September 14, 2006	2.692	2.754	2%	2.757	2.225	-19%	0.574	0.518	-0.056
September 28, 2006	2.188	2.608	19%	2.275	3.784	66%	0.543	0.692	0.149
October 5, 2006	2.745	2.798	2%	2.545	2.006	-21%	0.590	0.490	-0.100
October 17, 2006	2.585	2.626	2%	2.702	2.06	-24%	0.612	0.497	-0.115
October 27, 2006	3.145	2.788	-11%	3.393	2.229	-34%	0.666	0.519	-0.147
November 7, 2006	3.363	2.715	-19%	3.473	2.279	-34%	0.689	0.526	-0.163
November 16, 2006	3.569	2.907	-19%	6.551	5.035	-23%	0.921	0.812	-0.109
November 22, 2006	3.055	2.503	-18%	2.719	1.588	-42%	0.576	0.443	-0.133
December 22, 2006	3.153	2.59	-18%	3.165	1.643	-48%	0.601	0.45	-0.151
January 1, 2007	3.038	2.573	-15%	3.126	2.183	-30%	0.602	0.513	-0.089
January 7, 2007	3.179	2.571	-19%	2.886	1.744	-40%	0.563	0.463	-0.100
March 1, 2007	3.440	2.584	-25%	2.980	1.803	-39%	0.570	0.469	-0.101
March 15, 2007	4.045	2.894	-28%	3.762	2.389	-36%	0.646	0.541	-0.105
April 4, 2007	2.697	2.452	-9%	2.078	1.775	-15%	0.470	0.466	-0.004
April 11, 2007	2.707	2.490	-8%	2.634	1.605	-39%	0.560	0.445	-0.115
April 14, 2007	4.103	3.144	-23%	4.176	2.743	-34%	0.693	0.582	-0.111


JF13
Simulated vs. Observed Event Volume
y = 0.5239x + 1.1572
R2 = 0.6124
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

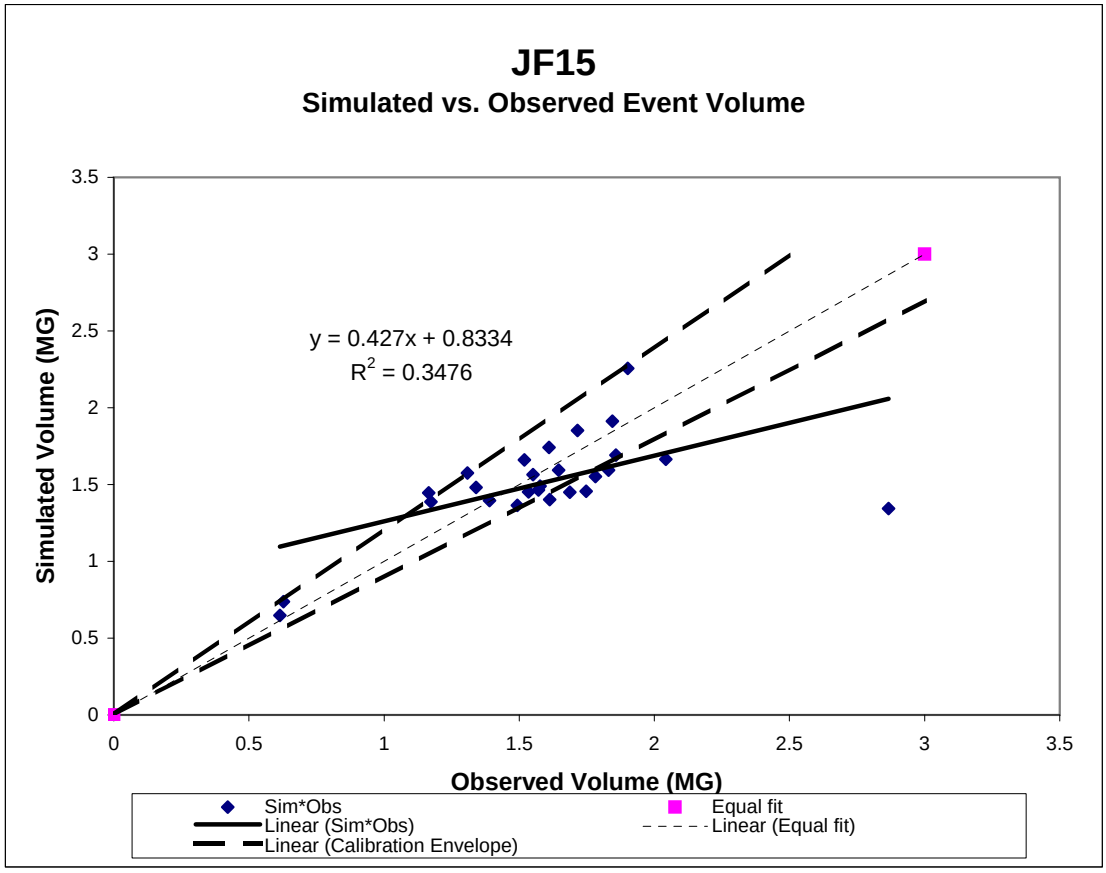

JF13
Simulated vs. Observed Event Peak
y = 1.0378x - 0.3098
R2 = 0.6043
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
8
9
10
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

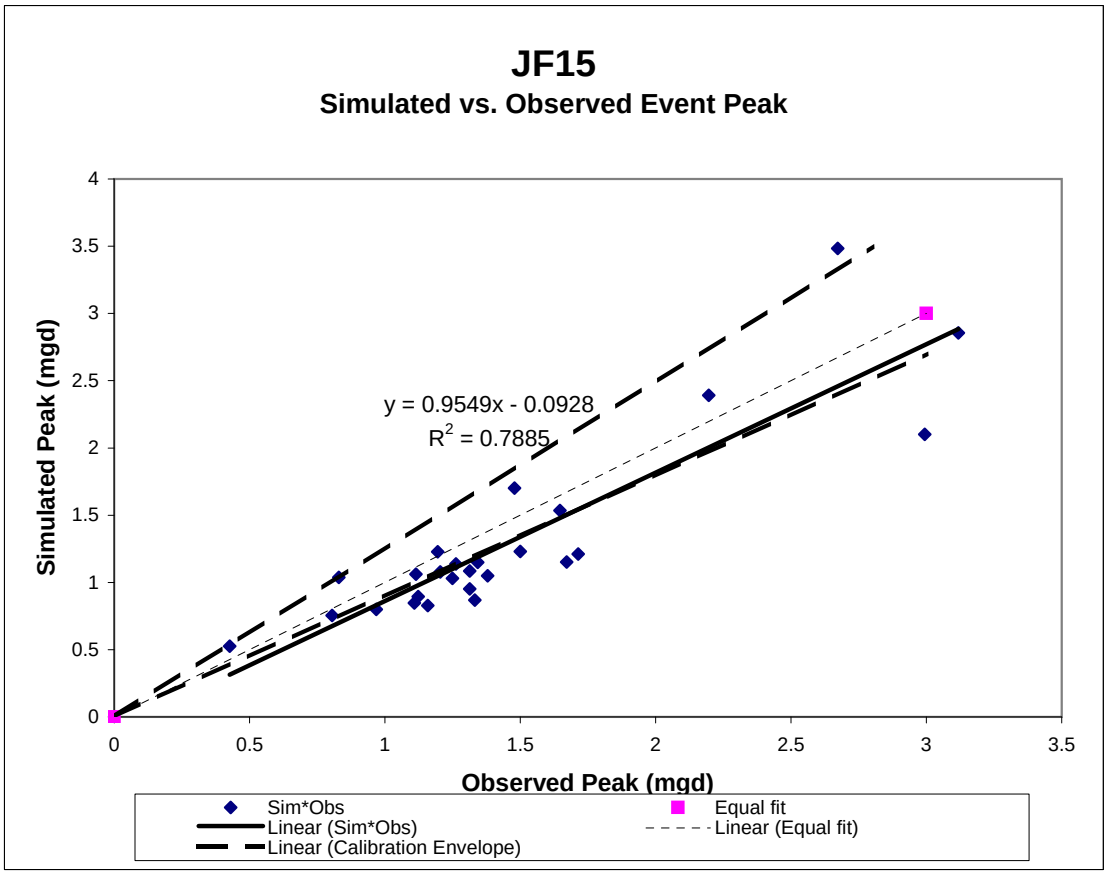
Storm Events	JF14 24-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.79	2.263	26%	2.897	3.062	6%	1.743	1.698	-0.045
June 1, 2006	0.871	0.968	11%	1.090	1.134	4%	1.267	1.325	0.058
June 2, 2006	0.929	1.086	17%	1.907	1.787	-6%	1.408	1.451	0.043
June 19, 2006	1.511	2.034	35%	1.546	2.036	32%	1.356	1.495	0.139
June 25, 2006	2.814	3.116	11%	3.185	5.742	80%	1.973	2.981	1.008
July 5, 2006	2.464	2.616	6%	2.430	4.641	91%	2.303	2.228	-0.075
July 22, 2006	1.804	2.106	17%	2.464	2.639	7%	1.545	1.614	0.069
August 7, 2006	2.867	1.993	-30%	1.489	1.745	17%	1.361	1.444	0.083
September 1, 2006	1.727	2.380	38%	2.045	1.754	-14%	1.530	1.446	-0.084
September 5, 2006	2.099	2.485	18%	2.992	4.363	46%	2.001	2.074	0.073
September 14, 2006	1.907	2.27	19%	4.525	1.652	-63%	1.497	1.425	-0.072
September 28, 2006	2.021	2.154	7%	2.015	2.301	14%	1.427	1.546	0.119
October 5, 2006	2.394	2.305	-4%	2.001	1.642	-18%	1.435	1.423	-0.012
October 17, 2006	2.248	2.169	-4%	2.152	1.665	-23%	1.471	1.428	-0.043
October 27, 2006	2.649	2.301	-13%	2.723	1.677	-38%	1.569	1.43	-0.139
November 7, 2006	2.766	2.245	-19%	3.133	1.699	-46%	1.514	1.435	-0.079
November 16, 2006	2.356	2.409	2%	4.943	3.498	-29%	2.021	1.790	-0.231
November 22, 2006	1.923	2.065	7%	1.763	1.255	-29%	1.393	1.351	-0.042
December 22, 2006	2.102	2.139	2%	2.346	1.239	-47%	1.426	1.357	-0.069
January 1, 2007	2.071	2.125	3%	1.971	1.613	-18%	1.422	1.417	-0.005
January 7, 2007	2.165	2.122	-2%	1.856	1.417	-24%	1.419	1.38	-0.039
March 1, 2007	2.936	2.132	-27%	2.597	1.494	-42%	1.485	1.392	-0.093
March 15, 2007	3.331	2.390	-28%	3.052	1.849	-39%	1.587	1.461	-0.126
April 4, 2007	2.378	2.021	-15%	1.673	1.285	-23%	1.308	1.357	0.049
April 11, 2007									
April 14, 2007									


JF14
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.4872x + 1.1042
R2 = 0.4585
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

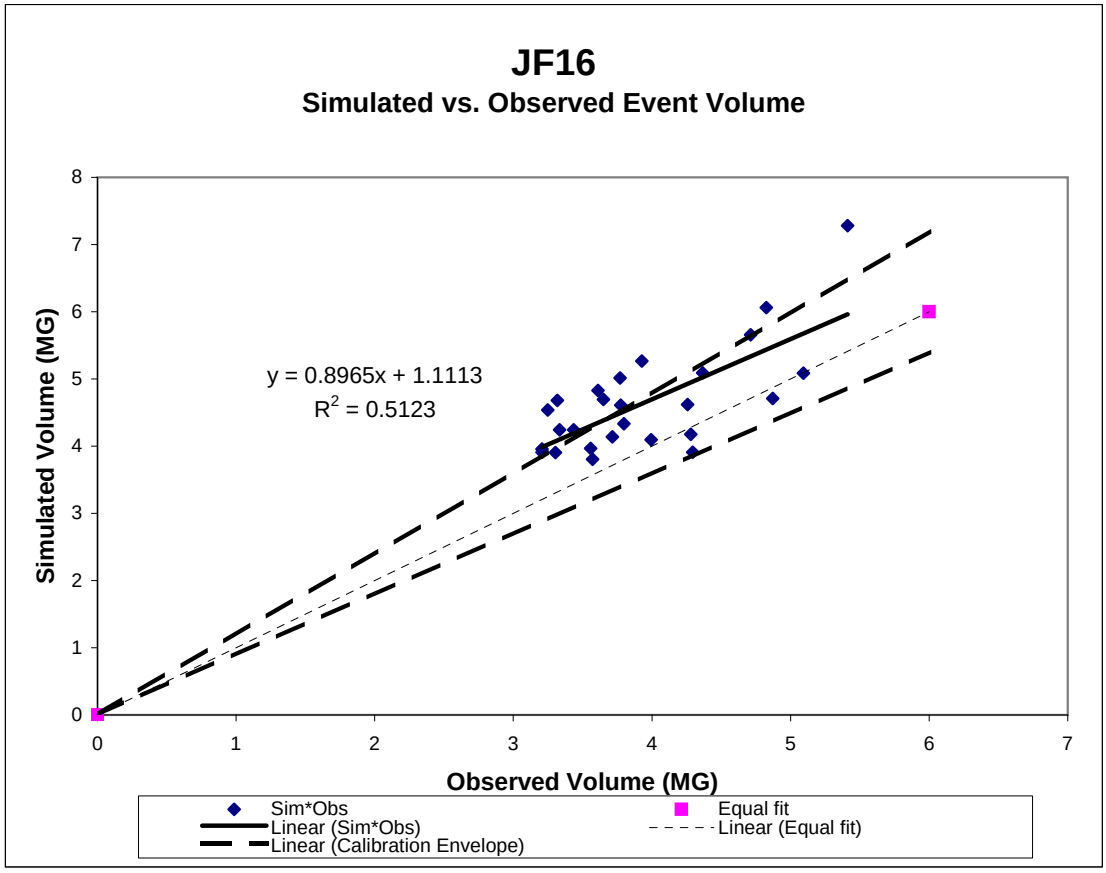

JF14
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.5584x + 0.8482
R2 = 0.1754
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

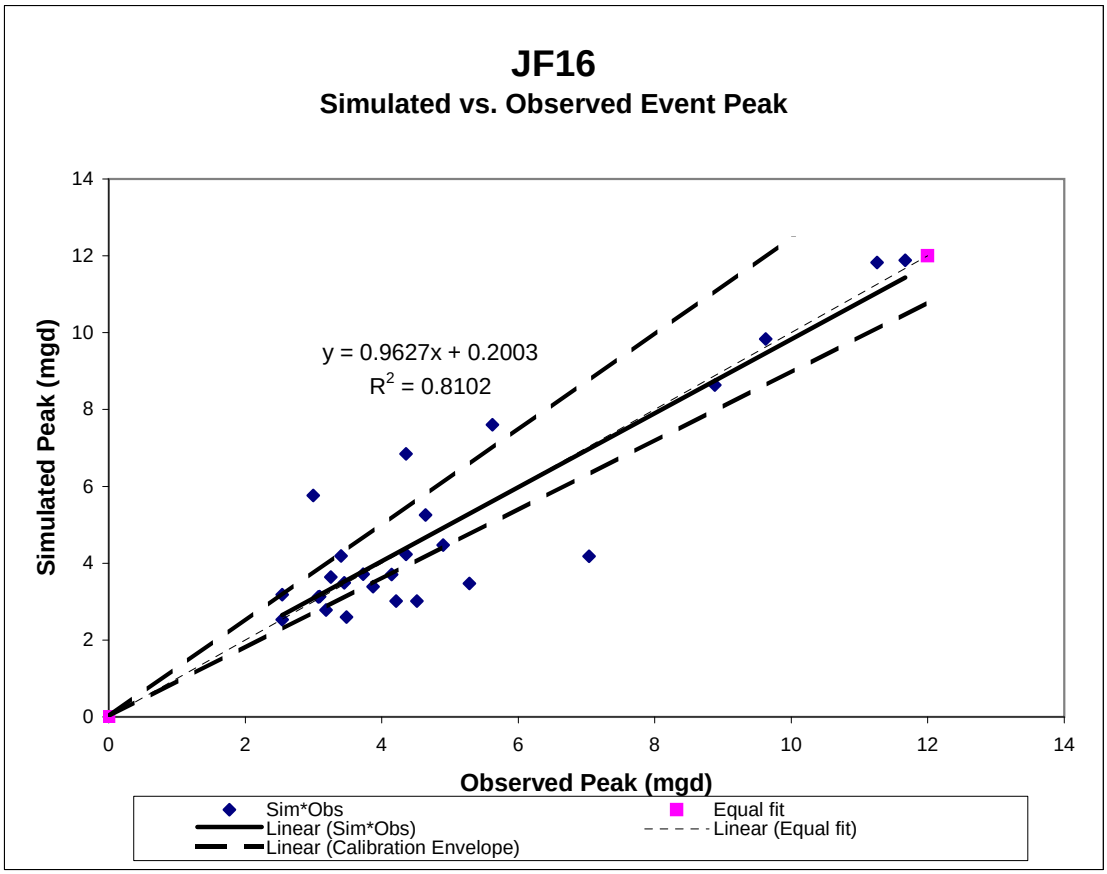
Storm Events	JF15 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.308	1.575	20%	1.647	1.535	-7%	0.543	0.513	-0.030
June 1, 2006	0.614	0.648	6%	0.805	0.754	-6%	0.362	0.360	-0.002
June 2, 2006	0.627	0.738	18%	1.123	0.895	-20%	0.439	0.389	-0.050
June 19, 2006	1.173	1.387	18%	0.83	1.037	25%	0.376	0.422	0.046
June 25, 2006	1.901	2.257	19%	2.673	3.483	30%	0.750	0.812	0.062
July 5, 2006	1.716	1.853	8%	3.118	2.856	-8%	0.782	0.717	-0.065
July 22, 2006	1.165	1.446	24%	1.313	1.084	-17%	0.463	0.431	-0.032
August 7, 2006	2.867	1.344	-53%	0.968	0.8	-17%	0.409	0.368	-0.041
September 1, 2006	1.519	1.661	9%	1.195	1.229	3%	0.439	0.453	0.014
September 5, 2006	1.610	1.742	8%	2.196	2.391	9%	0.645	0.643	-0.002
September 14, 2006	1.551	1.564	1%	1.249	1.031	-17%	0.464	0.421	-0.043
September 28, 2006	1.340	1.481	11%	1.115	1.061	-5%	0.473	0.426	-0.047
October 5, 2006	1.646	1.593	-3%	1.262	1.138	-10%	0.451	0.440	-0.011
October 17, 2006	1.577	1.49	-6%	1.343	1.149	-14%	0.451	0.441	-0.010
October 27, 2006	1.83	1.593	-13%	1.671	1.152	-31%	0.508	0.442	-0.066
November 7, 2006	1.782	1.553	-13%	1.5	1.23	-18%	0.483	0.453	-0.030
November 16, 2006	1.858	1.691	-9%	2.994	2.101	-30%	0.761	0.606	-0.155
November 22, 2006	1.613	1.403	-13%	1.158	0.829	-28%	0.418	0.374	-0.044
December 22, 2006	1.571	1.464	-7%	1.332	0.868	-35%	0.457	0.383	-0.074
January 1, 2007	1.535	1.452	-5%	1.205	1.077	-11%	0.433	0.429	-0.004
January 7, 2007	1.687	1.45	-14%	1.313	0.951	-28%	0.458	0.403	-0.055
March 1, 2007	1.748	1.456	-17%	1.379	1.049	-24%	0.451	0.424	-0.027
March 15, 2007	2.042	1.665	-18%	1.714	1.211	-29%	0.528	0.450	-0.078
April 4, 2007	1.493	1.364	-9%	1.109	0.848	-24%	0.474	0.378	-0.096
April 11, 2007	1.390	1.395	0%	0.427	0.525	23%	0.427	0.397	-0.030
April 14, 2007	1.845	1.912	4%	1.479	1.702	15%	0.506	0.502	-0.004


JF15
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.427x + 0.8334
R2 = 0.3476
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

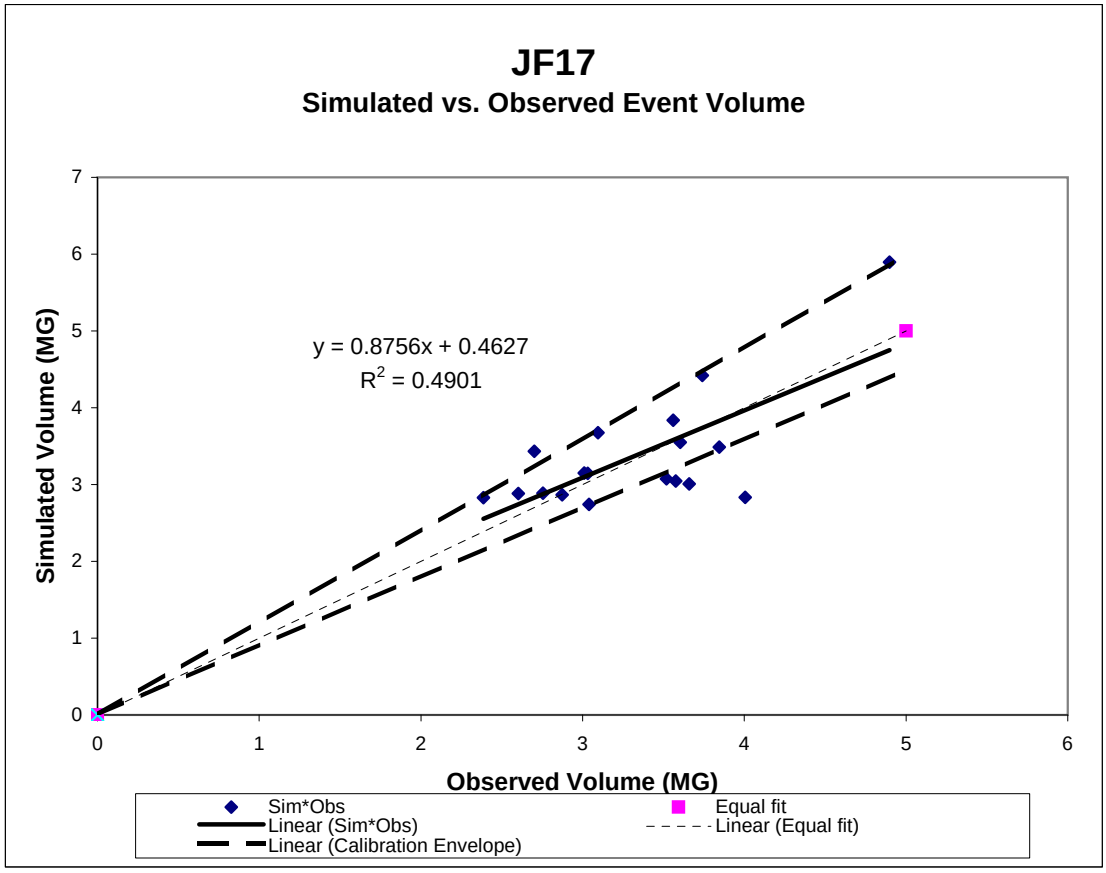

JF15
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.9549x - 0.0928
R2 = 0.7885
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

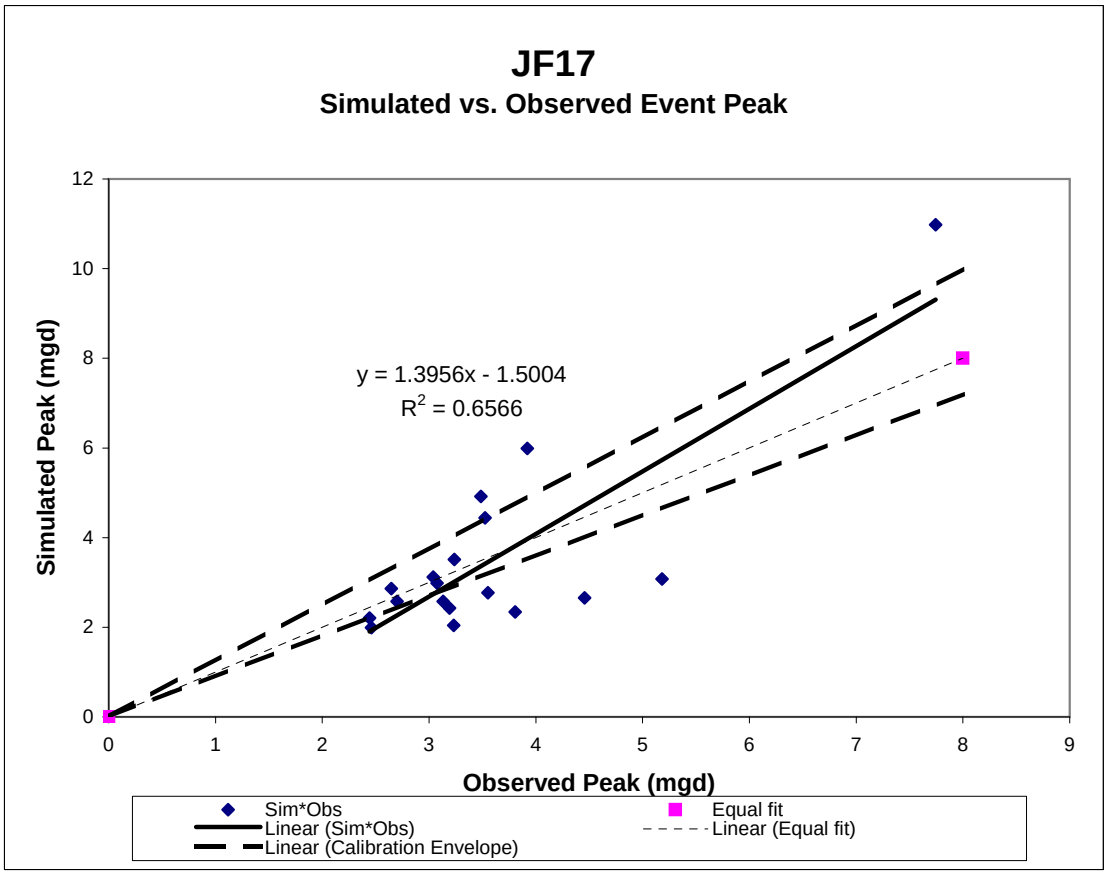
Storm Events	JF16 21-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	3.610	4.828	34%	4.354	6.847	57%	1.103	1.066	-0.037
June 1, 2006	3.304	3.904	18%	3.092	3.128	1%	0.904	0.747	-0.157
June 2, 2006	3.248	4.538	40%	2.998	5.764	92%	0.754	0.957	0.203
June 19, 2006	3.207	3.908	22%	2.543	3.181	25%	0.769	0.752	-0.017
June 25, 2006	5.412	7.283	35%	11.670	11.886	2%	2.026	2.439	0.413
July 5, 2006	4.826	6.062	26%	11.256	11.828	5%	2.197	2.430	0.233
July 22, 2006	3.318	4.681	41%	5.621	7.605	35%	1.566	1.161	-0.405
August 7, 2006	3.206	3.957	23%	3.070	3.122	2%	0.786	0.746	-0.040
September 1, 2006	3.770	5.012	33%	3.405	4.193	23%	0.839	0.836	-0.003
September 5, 2006	3.926	5.269	34%	9.625	9.839	2%	1.867	1.539	-0.328
September 14, 2006	4.258	4.620	9%	3.872	3.388	-13%	0.995	0.770	-0.225
September 28, 2006	3.435	4.243	24%	4.144	3.705	-11%	0.936	0.796	-0.140
October 5, 2006	3.650	4.696	29%	3.256	3.643	12%	0.779	0.791	0.012
October 17, 2006	3.798	4.331	14%	5.284	3.474	-34%	1.446	0.777	-0.669
October 27, 2006	4.872	4.710	-3%	7.036	4.184	-41%	1.518	0.835	-0.683
November 7, 2006	3.775	4.611	22%	4.901	4.469	-9%	1.227	0.860	-0.367
November 16, 2006	5.092	5.085	0%	8.880	8.640	-3%	2.183	1.327	-0.856
November 22, 2006	4.294	3.909	-9%	3.484	2.596	-25%	0.930	0.695	-0.235
December 22, 2006	4.280	4.176	-2%	4.516	3.014	-33%	1.039	0.736	-0.303
January 1, 2007	3.714	4.137	11%	3.728	3.711	0%	0.780	0.796	0.016
January 7, 2007	3.993	4.093	3%	4.209	3.014	-28%	0.944	0.736	-0.208
March 1, 2007	3.333	4.241	27%	3.453	3.489	1%	0.655	0.779	0.124
March 15, 2007	4.366	5.092	17%	4.354	4.229	-3%	0.826	0.839	0.013
April 4, 2007	3.572	3.804	6%	2.543	2.529	-1%	0.599	0.688	0.089
April 11, 2007	3.558	3.966	11%	3.183	2.778	-13%	0.792	0.713	-0.079
April 14, 2007	4.713	5.655	20%	4.642	5.256	13%	0.988	0.919	-0.069


JF16
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.8965x + 1.1113
R2 = 0.5123
0
1
2
3
4
5
6
7
8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

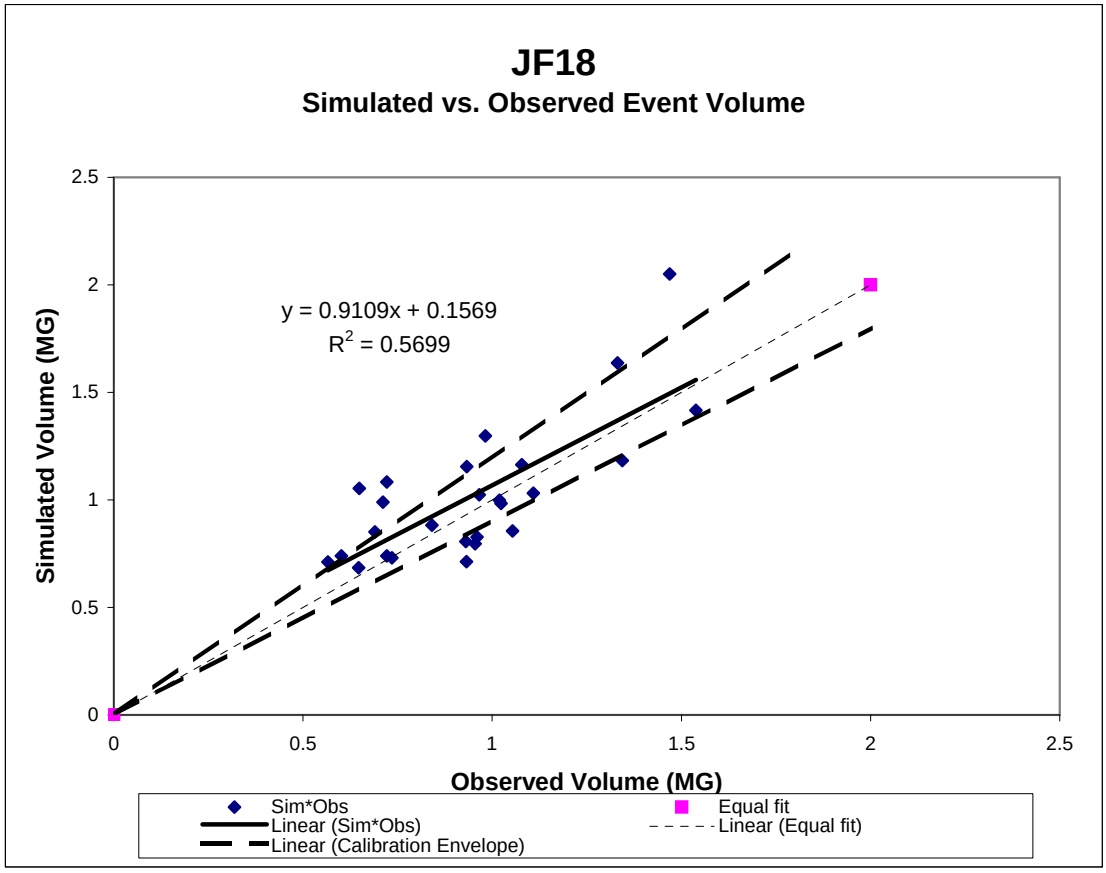

JF16
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.9627x + 0.2003
R2 = 0.8102
0
2
4
6
8
10
12
14
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

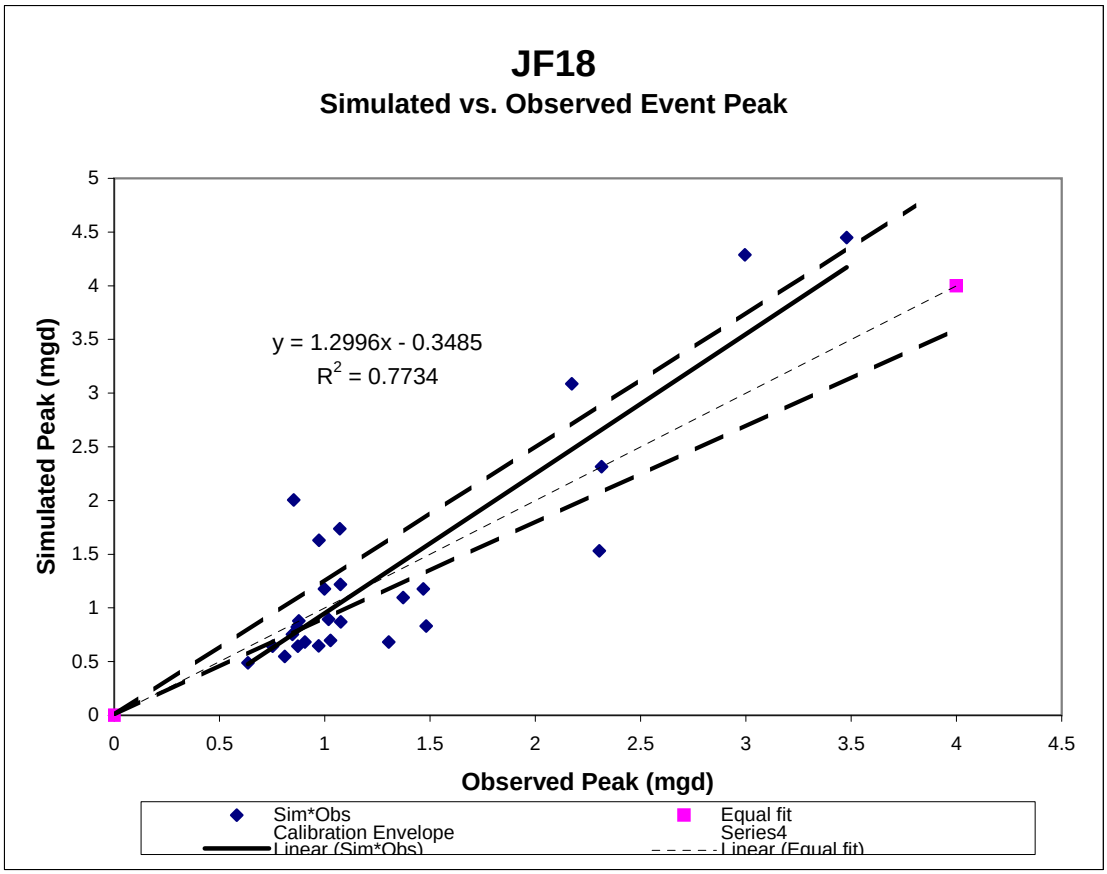
Storm Events	JF17 24-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	3.094	3.673	19%	3.921	5.989	53%	1.215	1.041	-0.174
June 1, 2006	2.874	2.868	0%	4.456	2.655	-40%	1.130	0.675	-0.455
June 2, 2006	2.702	3.432	27%	3.486	4.916	41%	0.787	0.937	0.150
June 19, 2006	2.387	2.831	19%	2.701	2.578	-5%	0.673	0.664	-0.009
June 25, 2006	4.897	5.895	20%	7.743	10.982	42%	2.562	3.354	0.792
July 5, 2006									
July 22, 2006									
August 7, 2006	2.602	2.884	11%	3.133	2.576	-18%	0.712	0.664	-0.048
September 1, 2006	3.560	3.839	8%	3.238	3.513	8%	0.711	0.775	0.064
September 5, 2006									
September 14, 2006	3.845	3.487	-9%	3.551	2.770	-22%	0.785	0.690	-0.095
September 28, 2006	3.032	3.147	4%	3.039	3.118	3%	0.701	0.725	0.024
October 5, 2006	3.604	3.552	-1%	3.075	2.987	-3%	0.699	0.712	0.013
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006	4.005	2.835	-29%	3.231	2.041	-37%	0.721	0.583	-0.138
December 22, 2006	3.518	3.077	-13%	3.805	2.338	-39%	0.844	0.626	-0.218
January 1, 2007	3.576	3.046	-15%	5.181	3.075	-41%	1.052	0.721	-0.331
January 7, 2007	3.659	3.010	-18%	3.193	2.427	-24%	0.715	0.641	-0.074
March 1, 2007	3.01	3.148	5%	2.647	2.862	8%	0.644	0.7	0.056
March 15, 2007									
April 4, 2007	3.039	2.742	-10%	2.462	1.989	-19%	0.708	0.576	-0.132
April 11, 2007	2.755	2.889	5%	2.443	2.209	-10%	0.659	0.606	-0.053
April 14, 2007	3.741	4.420	18%	3.523	4.439	26%	1.168	0.876	-0.292


JF17
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.8756x + 0.4627
R2 = 0.4901
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

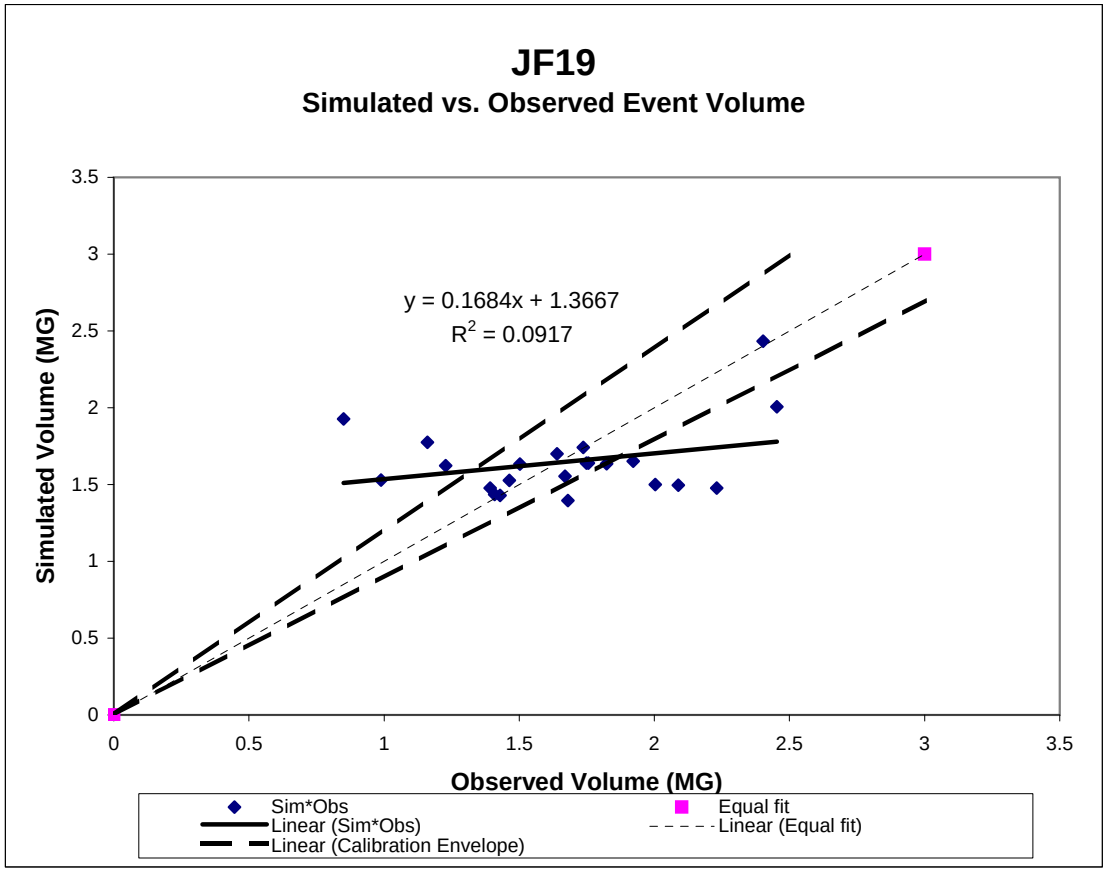

JF17
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.3956x - 1.5004
R2 = 0.6566
0
2
4
6
8
10
12
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

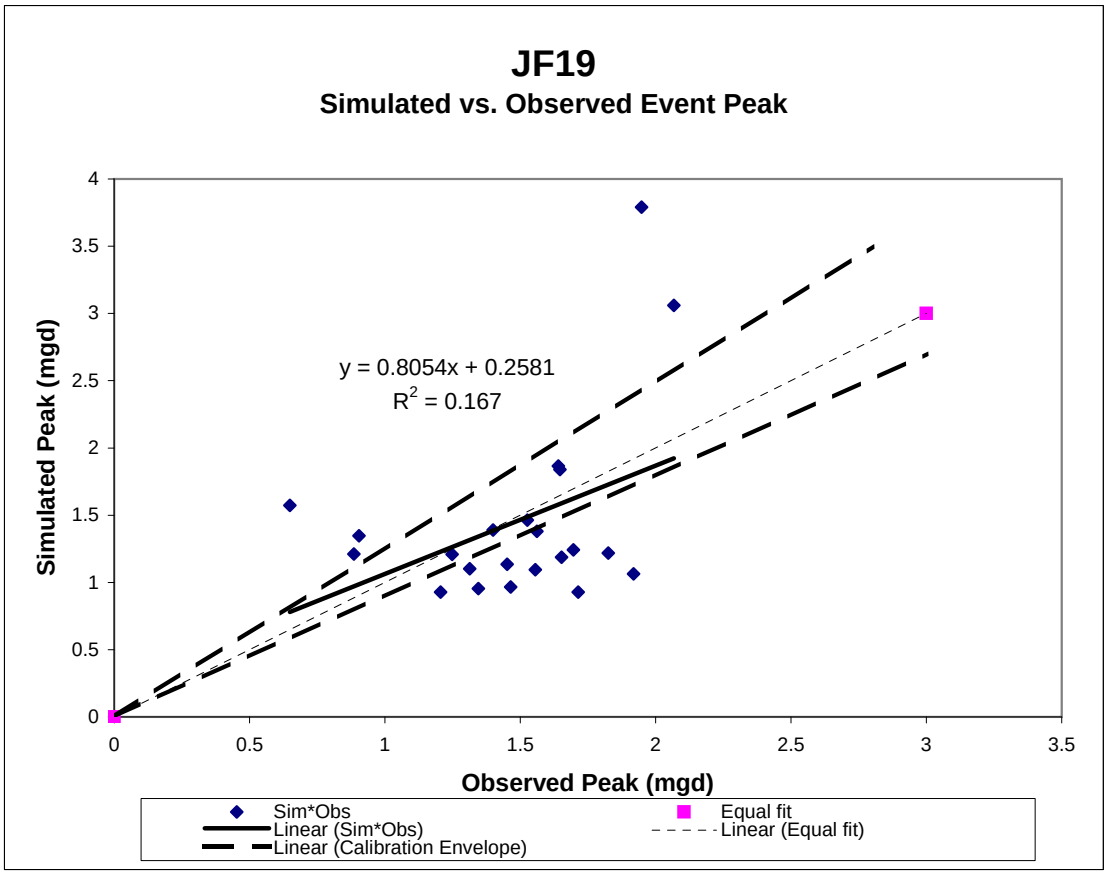
Storm Events	JF18 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.721	1.083	50%	1.072	1.736	62%	1.427	0.709	-0.718
June 1, 2006	0.735	0.730	-1%	1.027	0.698	-32%	1.420	0.487	-0.933
June 2, 2006	0.711	0.990	39%	0.973	1.631	68%	0.696	0.687	-0.009
June 19, 2006	0.566	0.712	26%	0.753	0.643	-15%	0.543	0.474	-0.069
June 25, 2006	1.469	2.051	40%	3.478	4.449	28%	3.509	3.560	0.051
July 5, 2006	1.331	1.637	23%	2.995	4.289	43%	2.294	1.856	-0.438
July 22, 2006	0.649	1.053	62%	0.852	2.006	135%	0.683	0.777	0.094
August 7, 2006	0.601	0.739	23%	0.906	0.683	-25%	0.656	0.486	-0.170
September 1, 2006	0.933	1.155	24%	0.998	1.176	18%	0.666	0.591	-0.075
September 5, 2006	0.982	1.297	32%	2.173	3.086	42%	1.080	0.997	-0.083
September 14, 2006	1.023	0.983	-4%	0.846	0.754	-11%	0.638	0.499	-0.139
September 28, 2006	0.690	0.851	23%	0.869	0.823	-5%	0.602	0.517	-0.085
October 5, 2006	0.966	1.024	6%	0.877	0.878	0%	0.652	0.528	-0.124
October 17, 2006	0.841	0.882	5%	1.018	0.894	-12%	0.679	0.531	-0.148
October 27, 2006	1.109	1.031	-7%	1.468	1.178	-20%	0.898	0.592	-0.306
November 7, 2006	1.019	0.999	-2%	1.075	1.220	13%	0.758	0.601	-0.157
November 16, 2006	1.078	1.164	8%	2.314	2.315	0%	1.045	0.831	-0.214
November 22, 2006	0.932	0.713	-23%	0.810	0.548	-32%	0.623	0.445	-0.178
December 22, 2006	0.960	0.828	-14%	1.304	0.683	-48%	0.804	0.481	-0.323
January 1, 2007	0.930	0.806	-13%	1.482	0.832	-44%	0.852	0.517	-0.335
January 7, 2007	0.955	0.796	-17%	0.873	0.645	-26%	0.654	0.472	-0.182
March 1, 2007	1.054	0.855	-19%	1.076	0.87	-19%	0.708	0.525	-0.183
March 15, 2007	1.344	1.183	-12%	1.372	1.097	-20%	0.856	0.577	-0.279
April 4, 2007	0.647	0.684	6%	0.635	0.490	-23%	0.910	0.428	-0.482
April 11, 2007	0.721	0.739	2%	0.971	0.647	-33%	0.832	0.471	-0.361
April 14, 2007	1.538	1.416	-8%	2.304	1.531	-34%	0.977	0.667	-0.310


JF18
Simulated vs. Observed Event Volume
y = 0.9109x + 0.1569
R2 = 0.5699
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

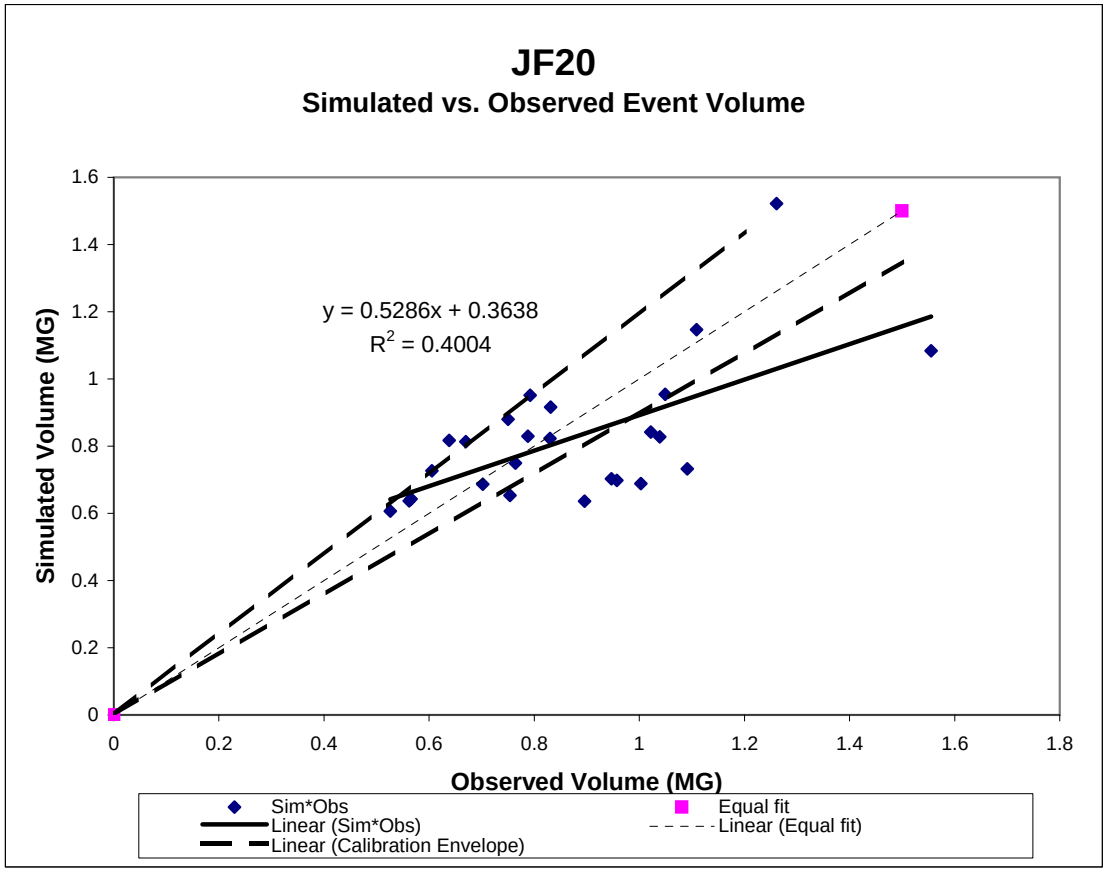

JF18
Simulated vs. Observed Event Peak
y = 1.2996x - 0.3485
R2 = 0.7734
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Calibration Envelope
Linear (Sim*Obs)
Equal fit
Series4
Linear (Equal fit)

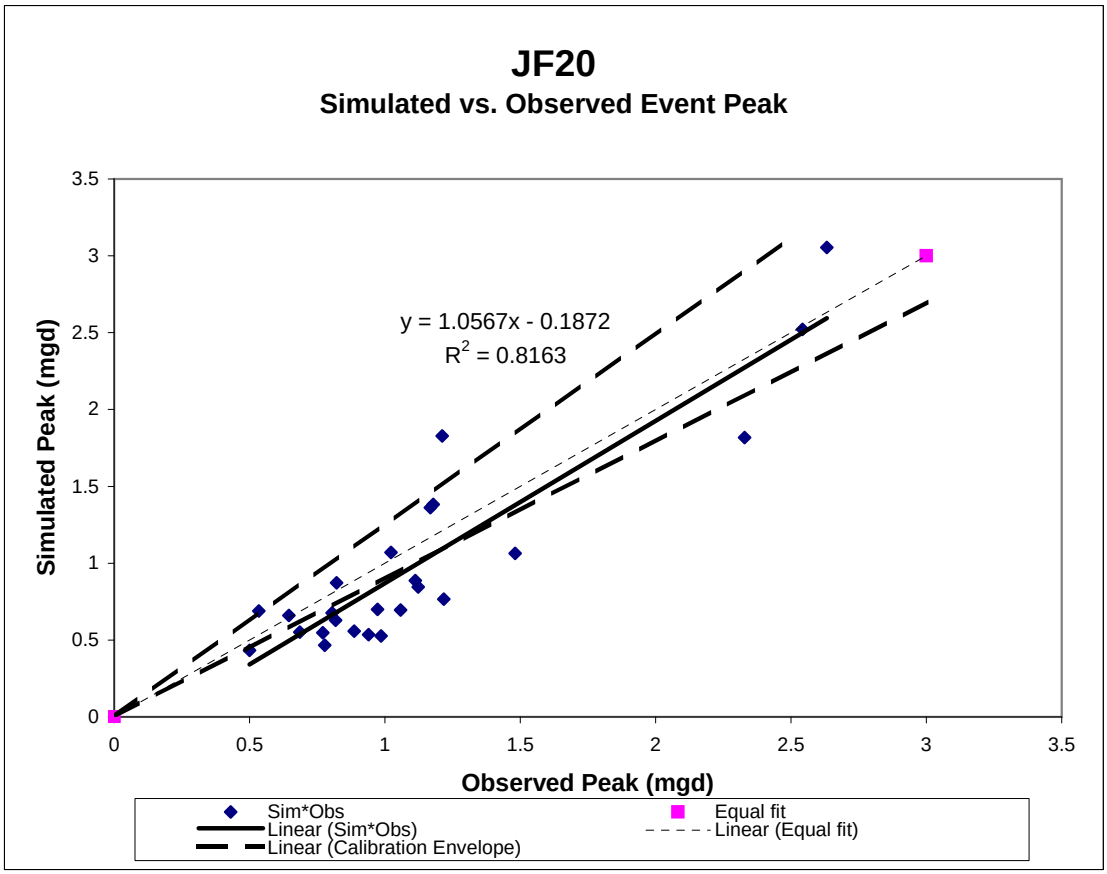
Storm Events	JF19 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.640	1.699	4%	1.646	1.839	12%	0.888	0.717	-0.171
June 1, 2006	1.392	1.478	6%	1.653	1.187	-28%	0.735	0.529	-0.206
June 2, 2006	1.228	1.623	32%	1.526	1.464	-4%	0.629	0.626	-0.003
June 19, 2006	1.429	1.429	0%	1.345	0.955	-29%	0.634	0.470	-0.164
June 25, 2006	2.402	2.433	1%	1.948	3.790	95%	0.977	6.297	5.320
July 5, 2006	2.453	2.007	-18%	2.067	3.060	48%	0.914	2.090	1.176
July 22, 2006	1.503	1.634	9%	1.641	1.866	14%	0.912	0.741	-0.171
August 7, 2006	1.409	1.435	2%	1.464	0.965	-34%	0.739	0.472	-0.267
September 1, 2006	1.737	1.741	0%	1.561	1.380	-12%	0.796	0.565	-0.231
September 5, 2006									
September 14, 2006	1.823	1.635	-10%	1.452	1.134	-22%	0.835	0.518	-0.317
September 28, 2006	1.463	1.528	4%	1.313	1.102	-16%	0.744	0.518	-0.226
October 5, 2006	1.749	1.639	-6%	1.248	1.208	-3%	0.752	0.532	-0.220
October 17, 2006	1.670	1.555	-7%	1.555	1.094	-30%	0.789	0.508	-0.281
October 27, 2006	1.922	1.652	-14%	1.696	1.241	-27%	0.811	0.538	-0.273
November 7, 2006	1.756	1.639	-7%	1.399	1.389	-1%	0.887	0.567	-0.320
November 16, 2006									
November 22, 2006									
December 22, 2006	2.003	1.499	-25%	1.714	0.928	-46%	0.698	0.455	-0.243
January 1, 2007	2.089	1.495	-28%	1.825	1.219	-33%	0.767	0.536	-0.231
January 7, 2007	2.231	1.477	-34%	1.919	1.063	-45%	0.829	0.492	-0.337
March 1, 2007	0.989	1.529	55%	0.885	1.212	37%	0.602	0.529	-0.073
March 15, 2007	1.16	1.776	53%	0.904	1.347	49%	0.608	0.562	-0.046
April 4, 2007	1.680	1.396	-17%	1.206	0.929	-23%	0.737	0.452	-0.285
April 11, 2007									
April 14, 2007	0.850	1.927	127%	0.649	1.574	143%	0.579	0.623	0.044


JF19
Simulated vs. Observed Event Volume
y = 0.1684x + 1.3667
R2 = 0.0917
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

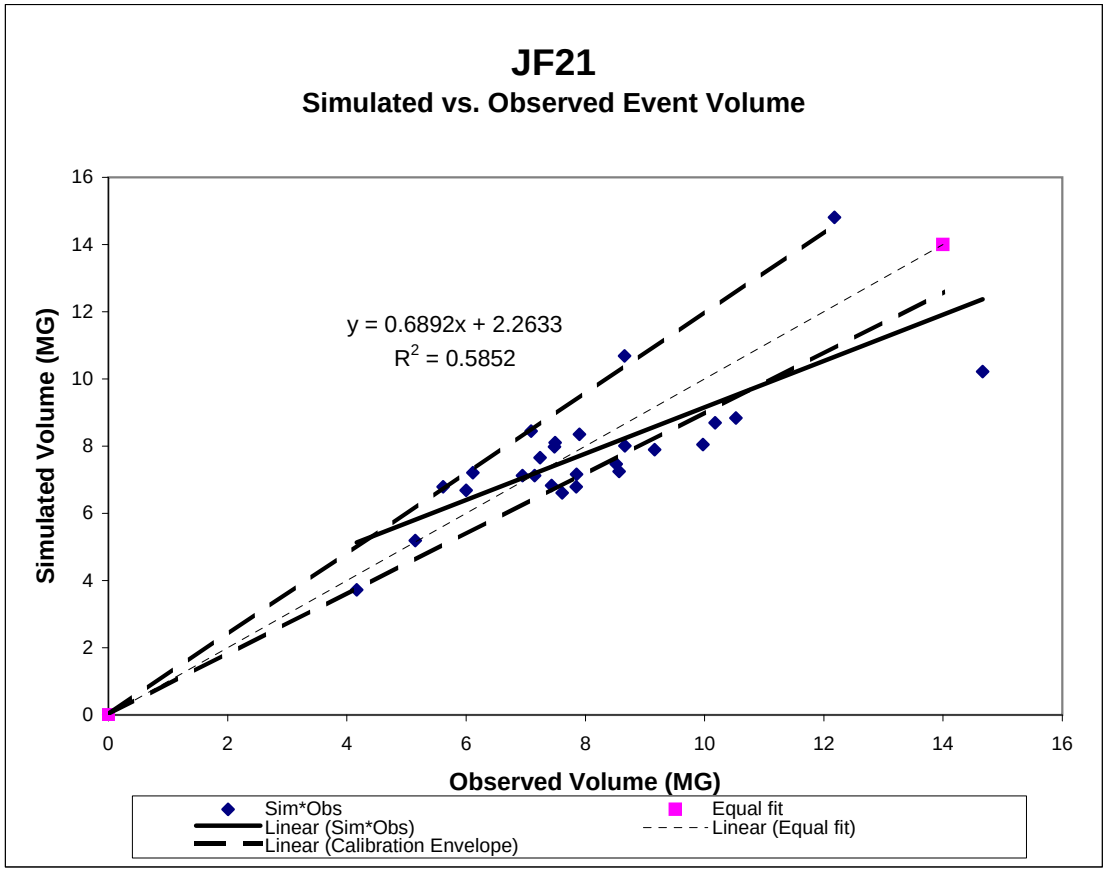

JF19
Simulated vs. Observed Event Peak
y = 0.8054x + 0.2581
R2 = 0.167
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

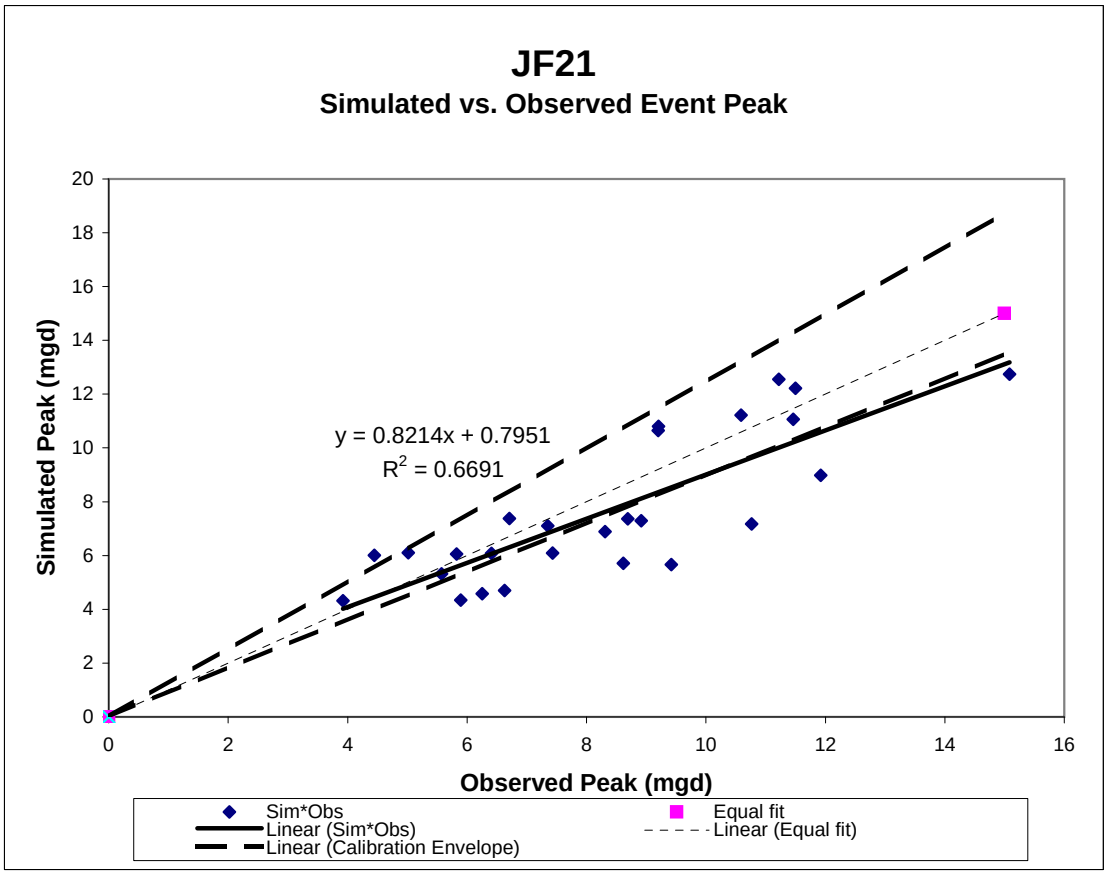
	JF20 12-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.750	0.880	17%	1.168	1.361	17%	0.433	0.452	0.019
June 1, 2006	0.702	0.687	-2%	1.218	0.767	-37%	0.448	0.330	-0.118
June 2, 2006	0.670	0.813	21%	1.022	1.071	5%	0.384	0.397	0.013
June 19, 2006	0.562	0.637	13%	0.771	0.548	-29%	0.332	0.282	-0.050
June 25, 2006	1.261	1.522	21%	2.632	3.055	16%	1.408	4.073	2.665
July 5, 2006	1.109	1.147	3%	2.543	2.521	-1%	1.280	1.548	0.268
July 22, 2006	0.638	0.817	28%	1.179	1.382	17%	0.438	0.458	0.020
August 7, 2006	0.566	0.643	14%	0.686	0.552	-20%	0.298	0.282	-0.016
September 1, 2006	0.831	0.916	10%	0.821	0.873	6%	0.341	0.353	0.012
September 5, 2006	0.792	0.951	20%	1.211	1.828	51%	0.429	0.557	0.128
September 14, 2006	0.830	0.823	-1%	0.818	0.628	-23%	0.338	0.297	-0.041
September 28, 2006	0.605	0.727	20%	0.645	0.660	2%	0.297	0.305	0.008
October 5, 2006	0.788	0.830	5%	0.534	0.689	29%	0.264	0.312	0.048
October 17, 2006	0.764	0.750	-2%	0.805	0.676	-16%	0.324	0.309	-0.015
October 27, 2006	1.022	0.842	-18%	1.123	0.845	-25%	0.402	0.349	-0.053
November 7, 2006	1.039	0.828	-20%	1.112	0.887	-20%	0.415	0.355	-0.060
November 16, 2006	1.049	0.954	-9%	2.329	1.818	-22%	0.838	0.555	-0.283
November 22, 2006	0.896	0.636	-29%	0.778	0.466	-40%	0.329	0.264	-0.065
December 22, 2006	0.947	0.703	-26%	0.940	0.535	-43%	0.364	0.279	-0.085
January 1, 2007	0.957	0.698	-27%	0.973	0.700	-28%	0.372	0.315	-0.057
January 7, 2007	1.003	0.689	-31%	0.887	0.558	-37%	0.353	0.284	-0.069
March 1, 2007	1.091	0.732	-33%	1.058	0.696	-34%	0.388	0.314	-0.074
March 15, 2007									
April 4, 2007	0.526	0.607	15%	0.500	0.434	-13%	0.277	0.255	-0.022
April 11, 2007	0.754	0.653	-13%	0.986	0.526	-47%	0.394	0.278	-0.116
April 14, 2007	1.555	1.084	-30%	1.481	1.064	-28%	0.485	0.395	-0.090


JF20
Simulated vs. Observed Event Volume
y = 0.5286x + 0.3638
R2 = 0.4004
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

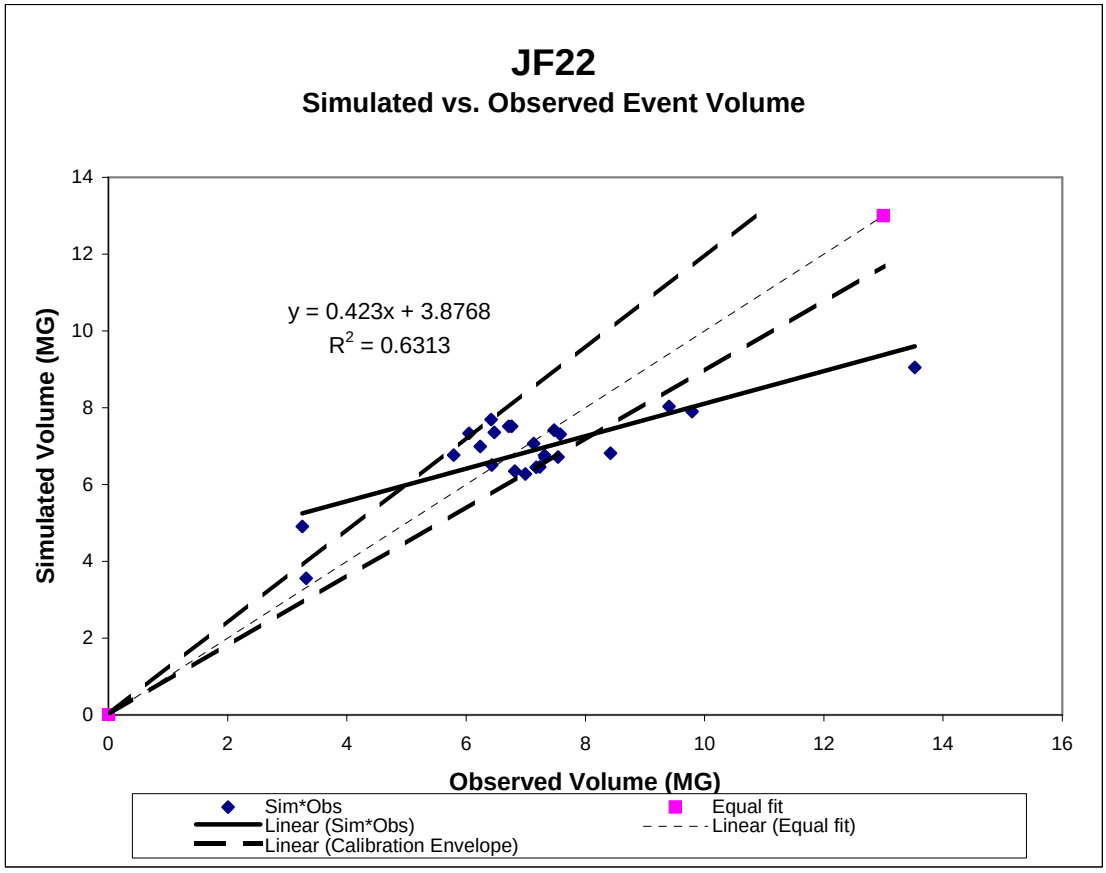

JF20
Simulated vs. Observed Event Peak
y = 1.0567x - 0.1872
R2 = 0.8163
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

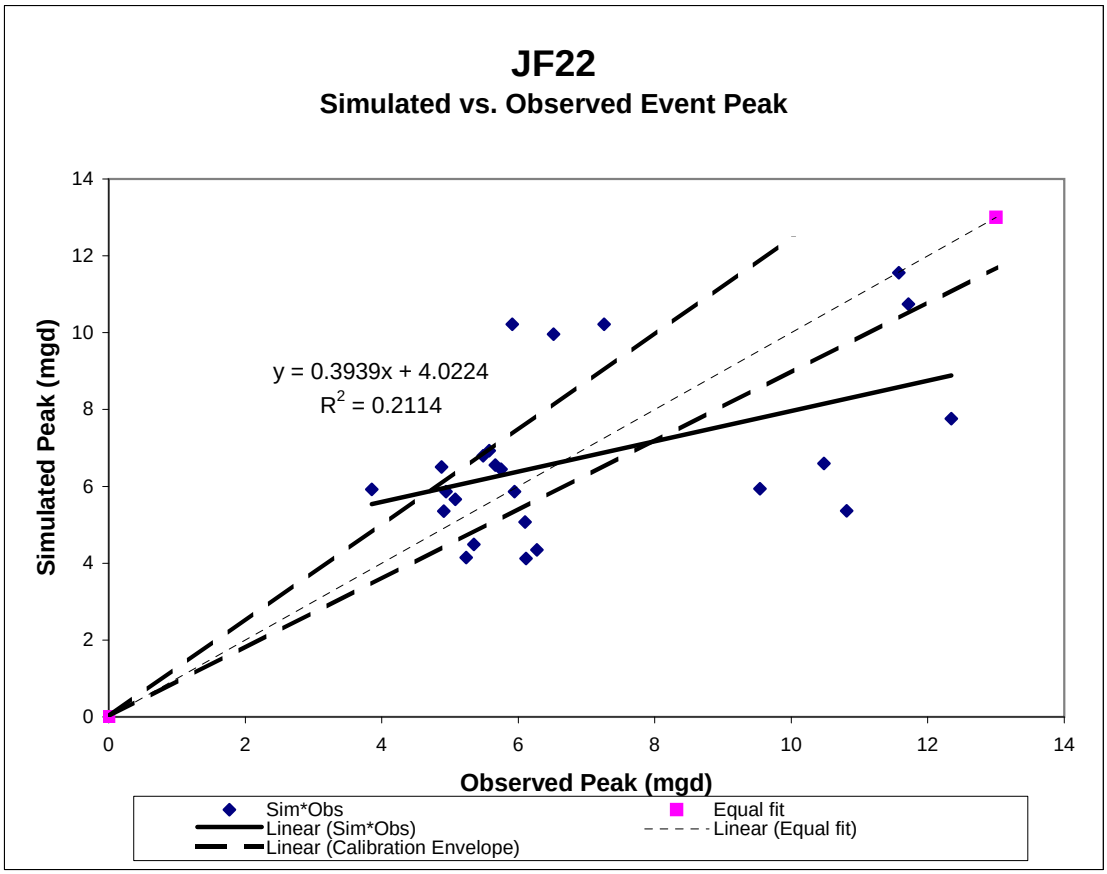
	JF21 21-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	8.664	8.014	-8%	9.204	10.805	17%	1.461	1.504	0.043
June 1, 2006	4.167	3.723	-11%	7.354	7.107	-3%	1.213	1.239	0.026
June 2, 2006	5.148	5.191	1%	11.462	11.06	-4%	1.727	1.518	-0.209
June 19, 2006	7.435	6.831	-8%	7.431	6.09	-18%	1.251	1.118	-0.133
June 25, 2006	12.181	14.811	22%	15.083	12.737	-16%	7.384	3.595	-3.789
July 5, 2006	8.658	10.690	23%	11.220	12.555	12%	2.711	3.596	0.885
July 22, 2006	7.238	7.661	6%	9.201	10.652	16%	1.600	1.495	-0.105
August 7, 2006	6.003	6.688	11%	4.447	6.003	35%	0.993	1.111	0.118
September 1, 2006	7.091	8.444	19%	6.707	7.382	10%	1.092	1.259	0.167
September 5, 2006	7.901	8.351	6%	10.588	11.217	6%	1.911	1.526	-0.385
September 14, 2006	7.494	8.102	8%	8.692	7.36	-15%	1.639	1.257	-0.382
September 28, 2006	6.115	7.214	18%	5.017	6.105	22%	1.004	1.119	0.115
October 5, 2006	7.484	7.984	7%	5.827	6.059	4%	1.200	1.116	-0.084
October 17, 2006	8.516	7.466	-12%	9.419	5.668	-40%	1.613	1.072	-0.541
October 27, 2006	9.973	8.044	-19%	10.765	7.173	-33%	1.973	1.244	-0.729
November 7, 2006	9.162	7.893	-14%	8.313	6.891	-17%	1.54	1.217	-0.323
November 16, 2006	10.524	8.838	-16%	11.499	12.216	6%	2.177	3.580	1.403
November 22, 2006	5.614	6.795	21%	3.923	4.320	10%	0.991	0.911	-0.080
December 22, 2006	7.147	7.12	0%	6.252	4.583	-27%	1.284	0.949	-0.335
January 1, 2007	7.854	7.165	-9%	6.411	6.075	-5%	1.311	1.117	-0.194
January 7, 2007	6.943	7.122	3%	5.573	5.319	-5%	1.184	1.022	-0.162
March 1, 2007	8.568	7.249	-15%	8.618	5.705	-34%	1.677	1.077	-0.600
March 15, 2007	10.176	8.696	-15%	8.918	7.290	-18%	2.280	1.252	-1.028
April 4, 2007	7.610	6.606	-13%	5.896	4.345	-26%	0.986	0.915	-0.071
April 11, 2007	7.846	6.789	-13%	6.626	4.696	-29%	1.151	0.964	-0.187
April 14, 2007	14.666	10.218	-30%	11.92	8.979	-25%	2.111	1.388	-0.723


JF21
Simulated vs. Observed Event Volume
y = 0.6892x + 2.2633
R2 = 0.5852
Simulated Volume (MG)
Observed Volume (MG)
0
2
4
6
8
10
12
14
16
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

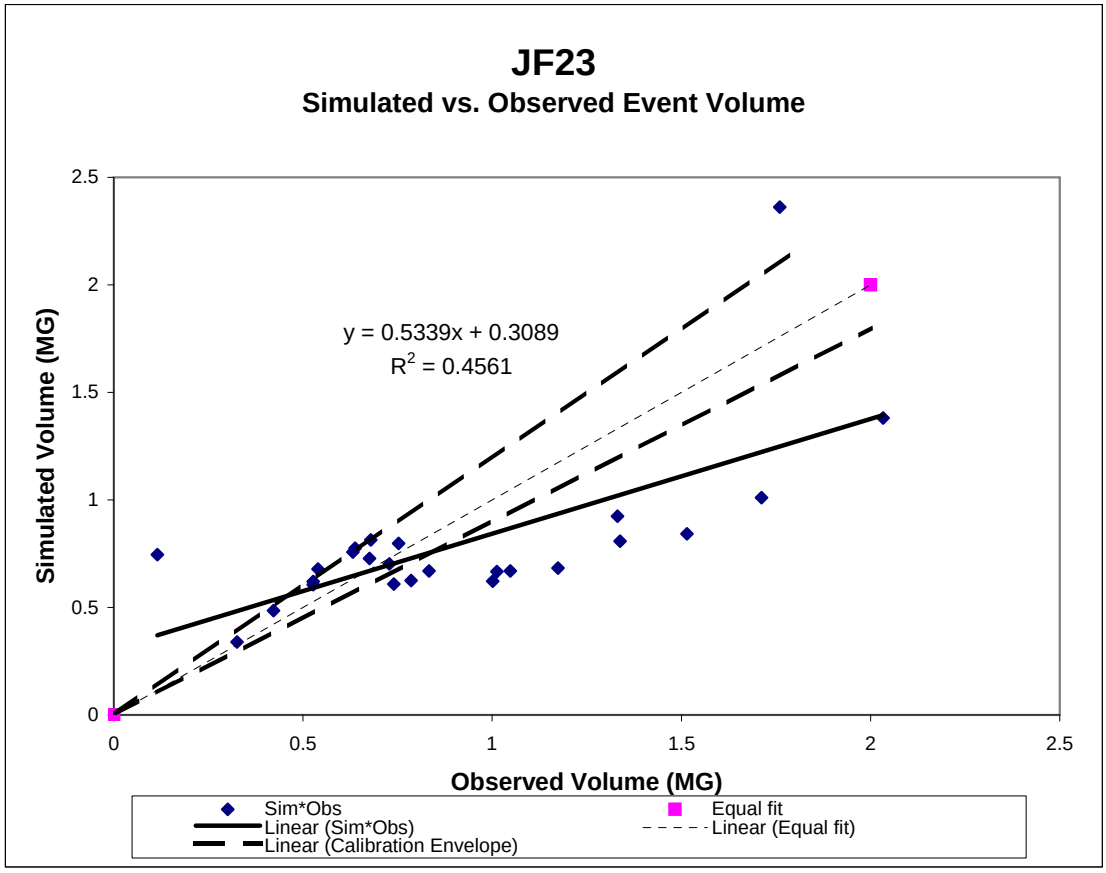

JF21
Simulated vs. Observed Event Peak
y = 0.8214x + 0.7951
R2 = 0.6691
Simulated Peak (mgd)
Observed Peak (mgd)
0
2
4
6
8
10
12
14
16
18
20
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

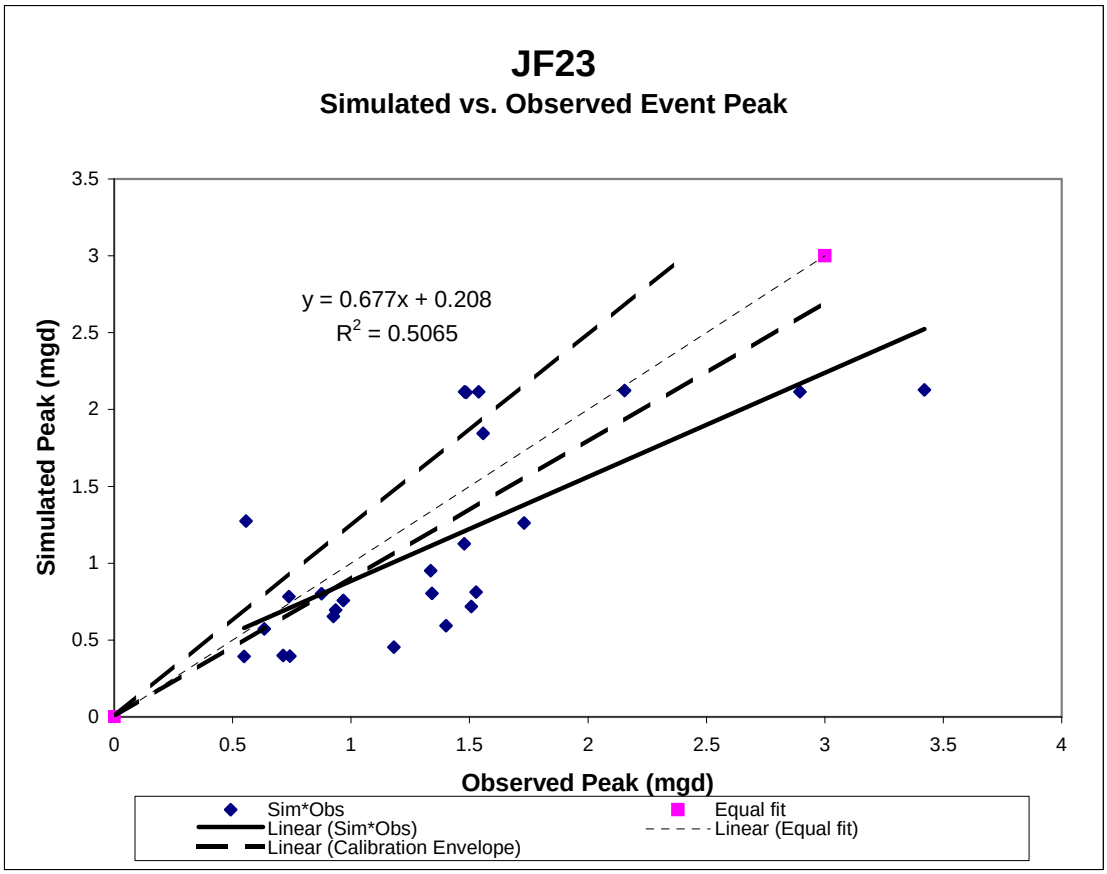
Storm Events	JF22 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	6.048	7.332	21%	5.913	10.223	73%	5.253	3.504	-1.749
June 1, 2006	3.317	3.558	7%	5.577	6.929	24%	0.713	0.713	0.000
June 2, 2006	3.251	4.91	51%	11.717	10.74	-8%	4.282	4.273	-0.009
June 19, 2006	6.432	6.505	1%	9.541	5.934	-38%	2.581	0.652	-1.929
June 25, 2006									
July 5, 2006									
July 22, 2006	7.132	7.070	-1%	7.256	10.221	41%	0.929	3.488	2.559
August 7, 2006	6.817	6.348	-7%	4.94	5.861	19%	0.692	0.649	-0.043
September 1, 2006	6.422	7.693	20%	4.876	6.505	33%	0.659	0.685	0.026
September 5, 2006	6.713	7.519	12%	6.519	9.957	53%	0.869	3.249	2.380
September 14, 2006	6.764	7.518	11%	5.484	6.795	24%	0.724	0.705	-0.019
September 28, 2006	5.793	6.769	17%	3.852	5.923	54%	0.542	0.651	0.109
October 5, 2006	6.472	7.360	14%	5.078	5.660	11%	0.674	0.640	-0.034
October 17, 2006	6.237	6.994	12%	4.909	5.359	9%	0.68	0.626	-0.054
October 27, 2006	7.478	7.418	-1%	5.665	6.558	16%	0.741	0.689	-0.052
November 7, 2006	7.581	7.308	-4%	5.747	6.449	12%	0.723	0.681	-0.042
November 16, 2006	9.406	8.037	-15%	11.575	11.556	0%	7.486	7.771	0.285
November 22, 2006	7.236	6.461	-11%	6.113	4.124	-33%	0.816	0.546	-0.270
December 22, 2006	7.324	6.699	-9%	6.273	4.35	-31%	0.764	0.559	-0.205
January 1, 2007	7.318	6.758	-8%	5.944	5.862	-1%	0.733	0.649	-0.084
January 7, 2007	7.543	6.717	-11%	6.1	5.075	-17%	0.763	0.61	-0.153
March 1, 2007	8.422	6.813	-19%	10.814	5.365	-50%	2.510	0.626	-1.884
March 15, 2007	9.788	7.897	-19%	10.481	6.593	-37%	5.733	0.691	-5.042
April 4, 2007	6.996	6.275	-10%	5.236	4.151	-21%	0.670	0.547	-0.123
April 11, 2007	7.175	6.452	-10%	5.351	4.490	-16%	0.686	0.569	-0.117
April 14, 2007	13.524	9.052	-33%	12.347	7.766	-37%	7.36	0.752	-6.608


JF22
Simulated vs. Observed Event Volume
y = 0.423x + 3.8768
R2 = 0.6313
Simulated Volume (MG)
Observed Volume (MG)
0
2
4
6
8
10
12
14
16
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

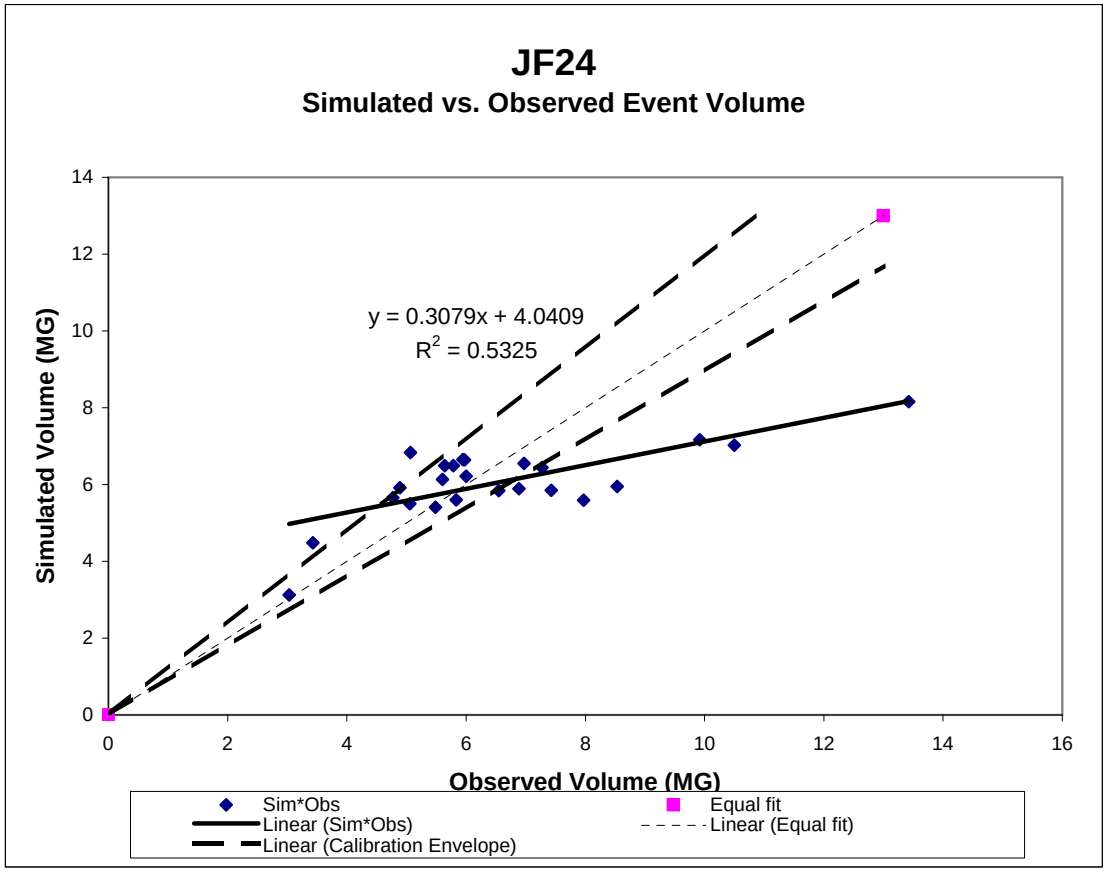

JF22
Simulated vs. Observed Event Peak
y = 0.3939x + 4.0224
R2 = 0.2114
Simulated Peak (mgd)
Observed Peak (mgd)
0
2
4
6
8
10
12
14
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

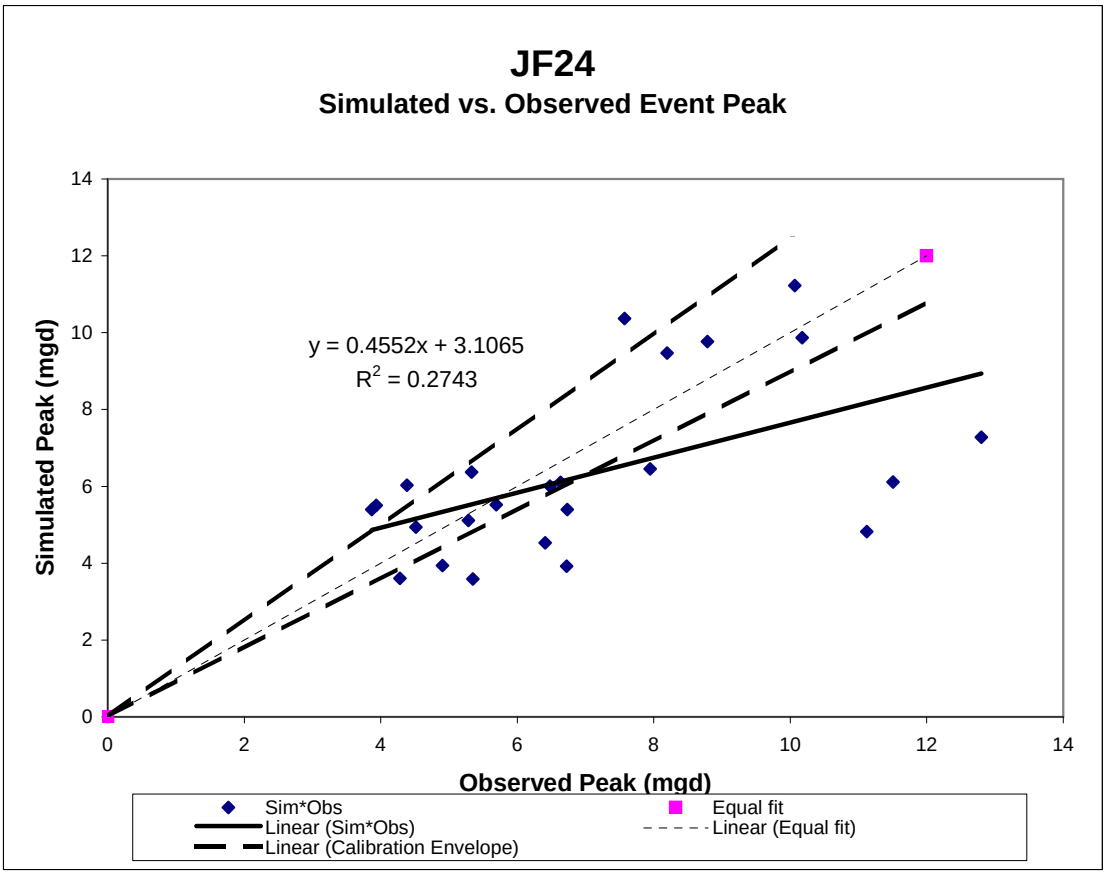
Storm Events	JF23 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.632	0.758	20%	1.486	2.111	42%	0.655	0.75	0.095
June 1, 2006	0.326	0.340	4%	1.508	0.718	-52%	0.660	0.473	-0.187
June 2, 2006	0.422	0.485	15%	1.558	1.844	18%	0.667	0.74	0.073
June 19, 2006	0.527	0.605	15%	0.741	0.396	-47%	0.381	0.349	-0.032
June 25, 2006	2.033	1.381	-32%	2.895	2.115	-27%	2.136	1.659	-0.477
July 5, 2006	1.331	0.924	-31%	3.421	2.127	-38%	2.781	1.740	-1.041
July 22, 2006	0.676	0.728	8%	1.479	2.115	43%	0.617	0.750	0.133
August 7, 2006	0.527	0.62	18%	0.634	0.573	-10%	0.434	0.421	-0.013
September 1, 2006	0.679	0.814	20%	1.336	0.951	-29%	0.664	0.546	-0.118
September 5, 2006	0.753	0.797	6%	1.539	2.116	37%	1.388	0.750	-0.638
September 14, 2006	1.76	2.362	34%	0.737	0.782	6%	0.477	0.608	0.131
September 28, 2006	0.540	0.679	26%	0.935	0.695	-26%	0.688	0.465	-0.223
October 5, 2006	0.638	0.775	21%	0.876	0.801	-9%	0.493	0.500	0.007
October 17, 2006	0.728	0.702	-4%	1.528	0.812	-47%	0.698	0.504	-0.194
October 27, 2006									
November 7, 2006	0.115	0.746	549%	0.557	1.275	129%	0.414	0.633	0.219
November 16, 2006	1.338	0.808	-40%	2.155	2.123	-1%	2.284	1.491	-0.793
November 22, 2006	1.001	0.622	-38%	0.713	0.399	-44%	0.414	0.350	-0.064
December 22, 2006	0.833	0.669	-20%	1.401	0.593	-58%	0.685	0.429	-0.256
January 1, 2007	1.012	0.667	-34%	0.967	0.757	-22%	0.49	0.486	-0.004
January 7, 2007	1.048	0.67	-36%	0.925	0.654	-29%	0.502	0.451	-0.051
March 1, 2007	1.174	0.683	-42%	1.342	0.804	-40%	0.607	0.501	-0.106
March 15, 2007	1.515	0.843	-44%	1.478	1.126	-24%	1.437	0.595	-0.842
April 4, 2007	0.740	0.609	-18%	0.549	0.394	-28%	0.427	0.348	-0.079
April 11, 2007	0.786	0.625	-20%	1.181	0.453	-62%	0.646	0.373	-0.273
April 14, 2007	1.712	1.01	-41%	1.73	1.261	-27%	1.86	0.629	-1.231


JF23
Simulated vs. Observed Event Volume
y = 0.5339x + 0.3089
R2 = 0.4561
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

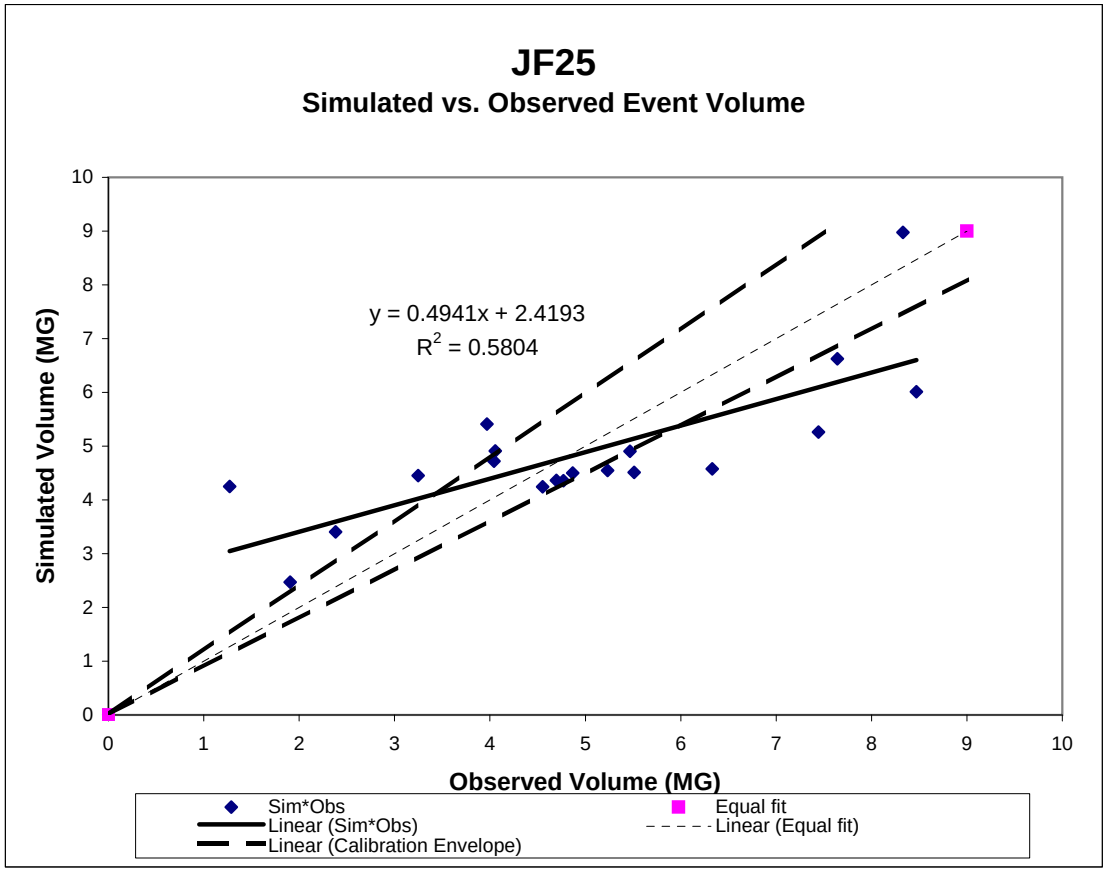

JF23
Simulated vs. Observed Event Peak
y = 0.677x + 0.208
R2 = 0.5065
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

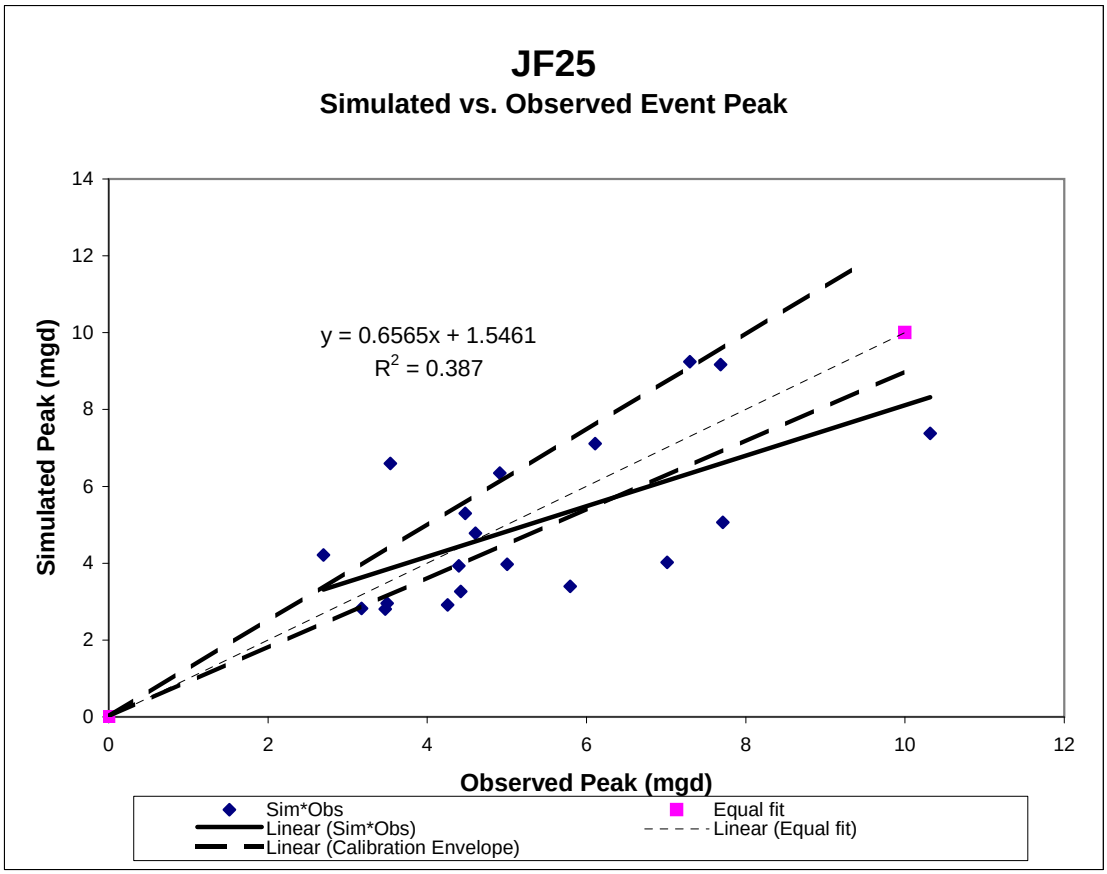
Storm Events	JF24 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	5.641	6.49	15%	8.785	9.771	11%	1.329	1.82	0.491
June 1, 2006	3.035	3.128	3%	7.947	6.458	-19%	1.303	0.881	-0.422
June 2, 2006	3.432	4.483	31%	7.57	10.37	37%	0.901	4.487	3.586
June 19, 2006	4.771	5.657	19%	5.692	5.518	-3%	0.829	0.814	-0.015
June 25, 2006									
July 5, 2006									
July 22, 2006	6.002	6.219	4%	10.176	9.871	-3%	1.323	1.817	0.494
August 7, 2006	5.055	5.499	9%	3.868	5.397	40%	0.594	0.801	0.207
September 1, 2006	5.066	6.830	35%	4.383	6.033	38%	0.733	0.854	0.121
September 5, 2006	5.975	6.644	11%	8.197	9.472	16%	1.336	1.162	-0.174
September 14, 2006	5.949	6.649	12%	5.333	6.374	20%	0.852	0.874	0.022
September 28, 2006	4.887	5.914	21%	3.936	5.503	40%	0.699	0.812	0.113
October 5, 2006	5.787	6.491	12%	5.285	5.112	-3%	0.769	0.772	0.003
October 17, 2006	5.603	6.13	9%	4.517	4.937	9%	0.787	0.759	-0.028
October 27, 2006	6.97	6.552	-6%	6.479	6.002	-7%	0.882	0.852	-0.030
November 7, 2006	7.275	6.441	-11%	6.635	6.105	-8%	0.885	0.858	-0.027
November 16, 2006	9.920	7.163	-28%	10.064	11.229	12%	1.776	1.175	-0.601
November 22, 2006	7.968	5.595	-30%	5.348	3.586	-33%	0.811	0.644	-0.167
December 22, 2006	6.549	5.845	-11%	6.722	3.925	-42%	0.912	0.672	-0.240
January 1, 2007	6.887	5.893	-14%	6.734	5.4	-20%	0.912	0.801	-0.111
January 7, 2007	7.43	5.853	-21%	6.411	4.527	-29%	0.886	0.732	-0.154
March 1, 2007	8.532	5.948	-30%	11.119	4.824	-57%	1.729	0.751	-0.978
March 15, 2007	10.496	7.024	-33%	11.505	6.110	-47%	2.254	0.858	-1.396
April 4, 2007	5.485	5.411	-1%	4.282	3.606	-16%	0.663	0.646	-0.017
April 11, 2007	5.834	5.597	-4%	4.904	3.937	-20%	0.697	0.673	-0.024
April 14, 2007	13.421	8.16	-39%	12.8	7.276	-43%	2.067	0.958	-1.109


JF24
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3079x + 4.0409
R2 = 0.5325
0
2
4
6
8
10
12
14
16
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

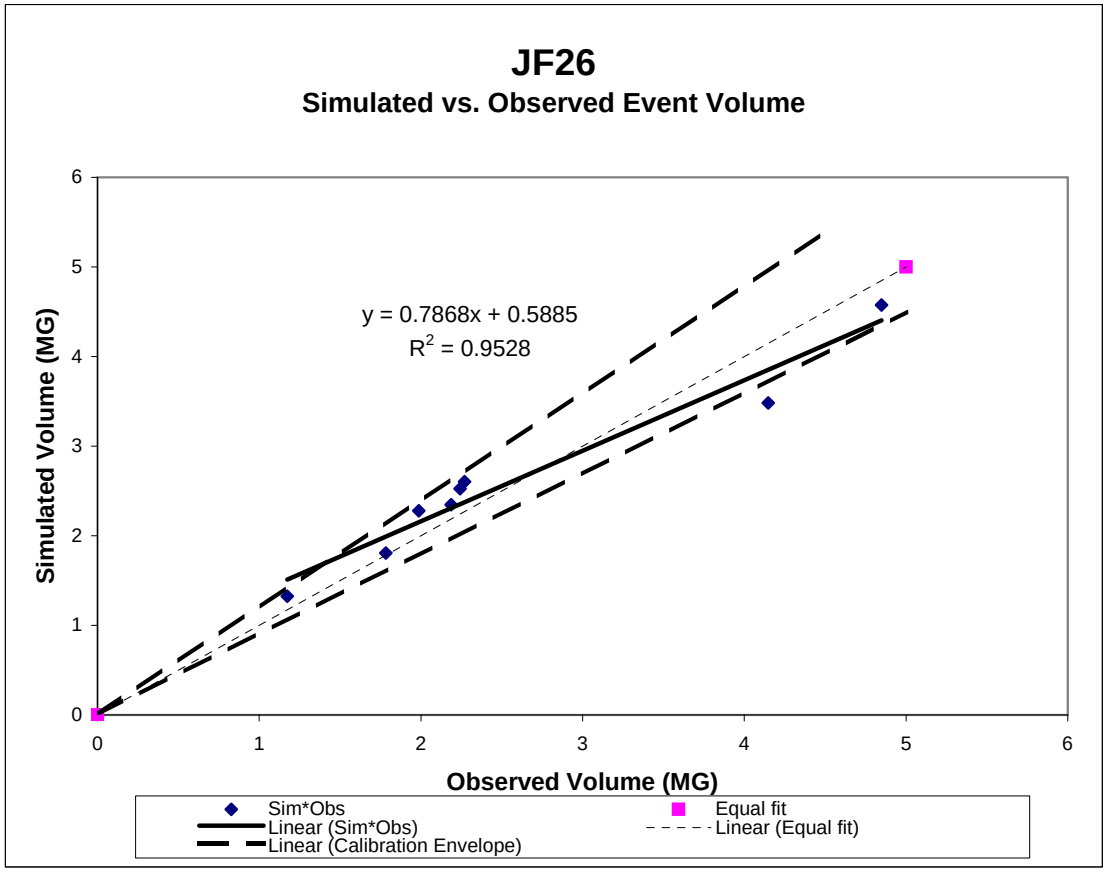

JF24
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.4552x + 3.1065
R2 = 0.2743
0
2
4
6
8
10
12
14
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

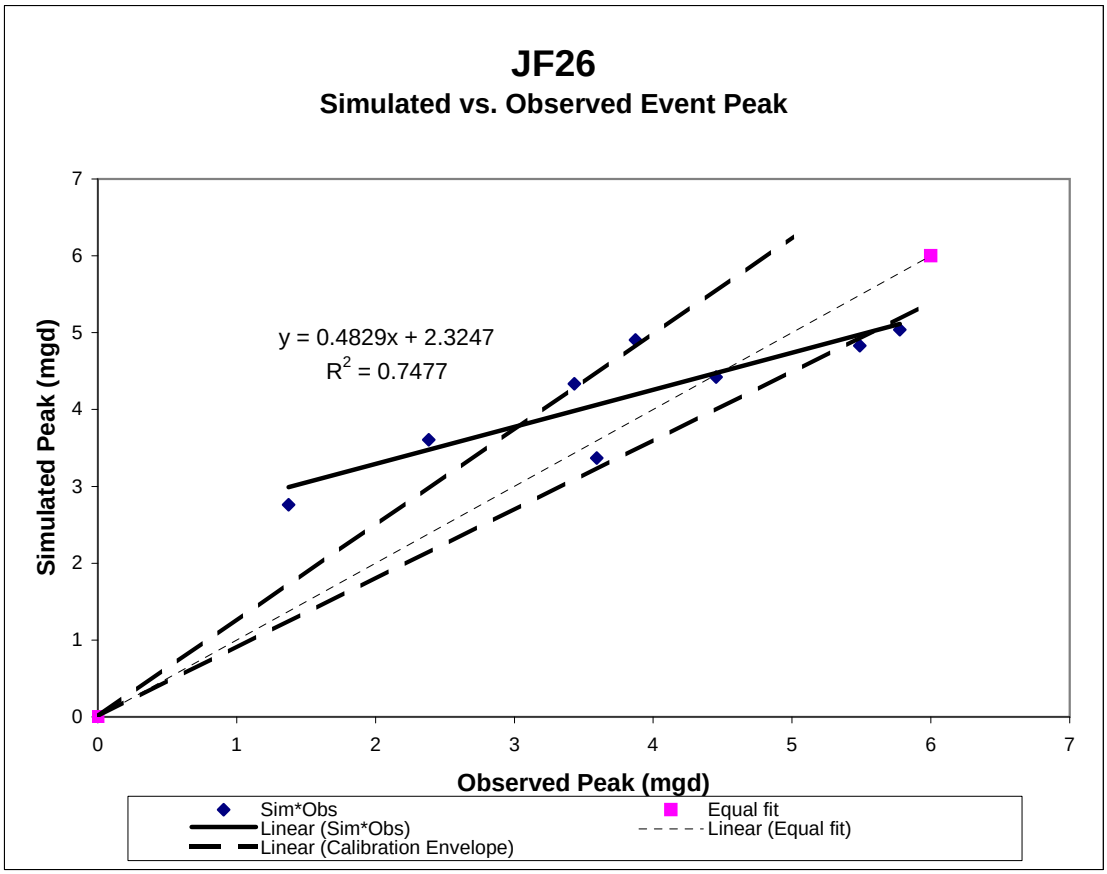
	JF25 21-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	4.057	4.908	21%	4.912	6.343	29%	2.508	0.961	-1.547
June 1, 2006	1.904	2.471	30%	4.475	5.296	18%	0.895	0.835	-0.060
June 2, 2006	2.382	3.405	43%	6.11	7.114	16%	5.456	1.054	-4.402
June 19, 2006	3.246	4.455	37%	4.607	4.784	4%	2.385	0.763	-1.622
June 25, 2006	8.331	8.977	8%	7.300	9.244	27%	5.941	8.603	2.662
July 5, 2006	7.641	6.625	-13%	7.684	9.173	19%	5.568	6.308	0.740
July 22, 2006	4.043	4.720	17%	3.538	6.595	86%	0.721	1.002	0.281
August 7, 2006	1.272	4.248	234%	2.698	4.212	56%	0.65	0.714	0.064
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006	5.469	4.903	-10%	5.005	3.971	-21%	0.752	0.685	-0.067
November 16, 2006	3.969	5.411	36%	10.315	7.375	-29%	1.532	1.092	-0.440
November 22, 2006	4.695	4.366	-7%	3.471	2.806	-19%	0.592	0.565	-0.027
December 22, 2006	4.869	4.501	-8%	4.257	2.915	-32%	0.672	0.579	-0.093
January 1, 2007	5.233	4.547	-13%	4.396	3.93	-11%	0.689	0.68	-0.009
January 7, 2007	5.512	4.511	-18%	4.421	3.261	-26%	0.691	0.621	-0.070
March 1, 2007	6.330	4.576	-28%	5.797	3.394	-41%	0.843	0.633	-0.210
March 15, 2007	7.443	5.263	-29%	7.014	4.021	-43%	0.969	0.691	-0.278
April 4, 2007	4.551	4.245	-7%	3.174	2.822	-11%	0.537	0.567	0.030
April 11, 2007	4.769	4.360	-9%	3.497	2.960	-15%	0.584	0.584	0.000
April 14, 2007	8.469	6.009	-29%	7.711	5.064	-34%	2.123	0.797	-1.326


JF25
Simulated vs. Observed Event Volume
y = 0.4941x + 2.4193
R2 = 0.5804
Simulated Volume (MG)
Observed Volume (MG)
0
1
2
3
4
5
6
7
8
9
10
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

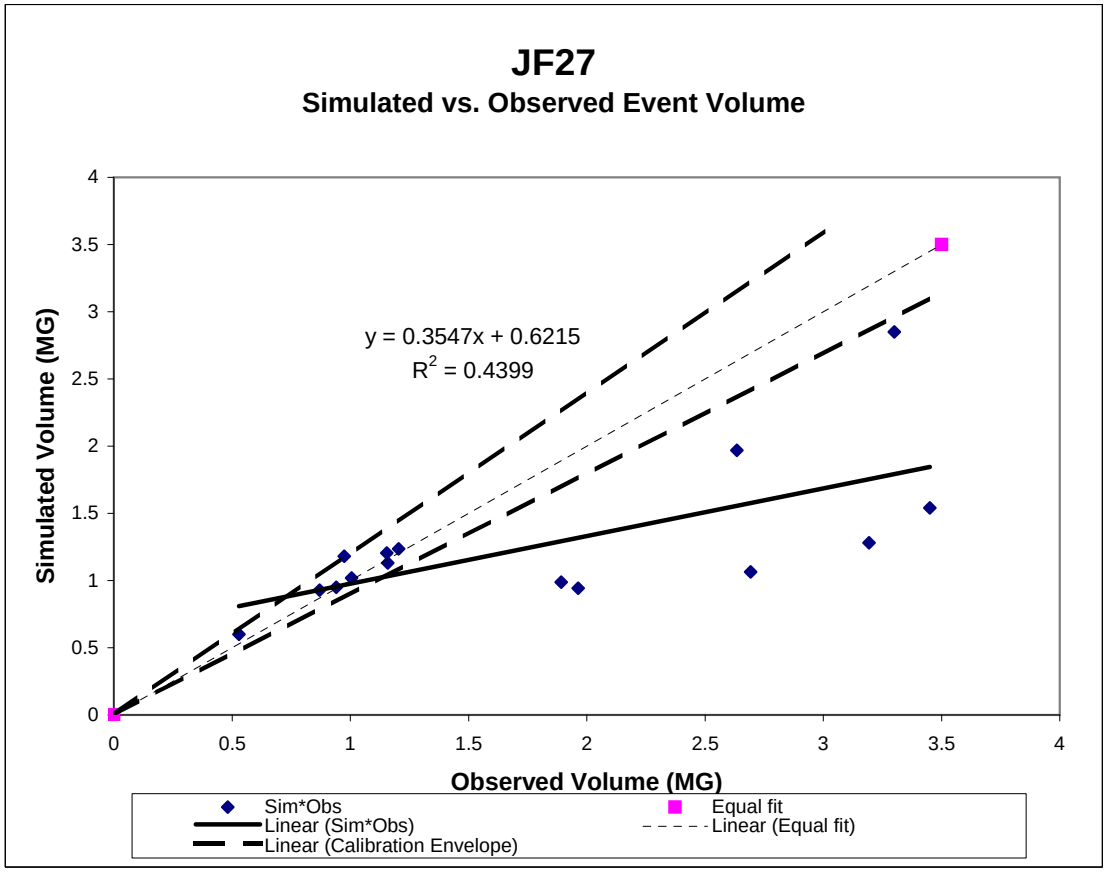

JF25
Simulated vs. Observed Event Peak
y = 0.6565x + 1.5461
R2 = 0.387
Simulated Peak (mgd)
Observed Peak (mgd)
0
2
4
6
8
10
12
14
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

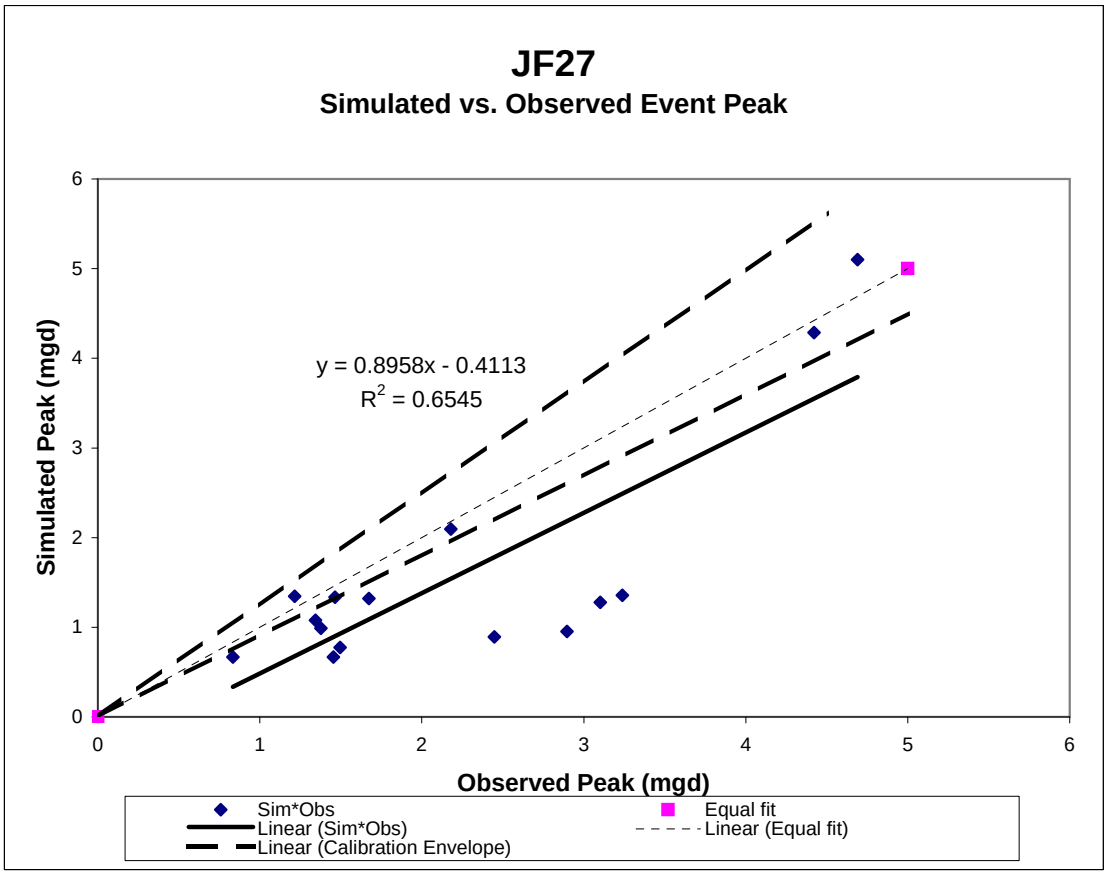
	JF26 15-inch Diameter Pipe								
Storm Events	**Volume (mg)** (-10% to+20%)			**Peak Flow (mgd)**(-10%to+25%)			**Depth (ft.)**(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.269	2.605	15%	3.432	4.333	26%	2.183	3.437	1.254
June 1, 2006	1.173	1.325	13%	2.383	3.607	51%	0.706	0.980	0.274
June 2, 2006	1.783	1.807	1%	4.454	4.422	-1%	5.729	3.891	-1.838
June 19, 2006	2.186	2.346	7%	3.593	3.369	-6%	0.962	0.753	-0.209
June 25, 2006	4.848	4.575	-6%	5.776	5.037	-13%	10.179	8.110	-2.069
July 5, 2006	4.148	3.483	-16%	5.487	4.832	-12%	9.565	7.023	-2.542
July 22, 2006	2.242	2.525	13%	3.873	4.904	27%	4.233	6.433	2.200
August 7, 2006	1.986	2.278	15%	1.374	2.762	101%	0.408	0.614	0.206
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007									
March 15, 2007									
April 4, 2007									
April 11, 2007									
April 14, 2007									


JF26
Simulated vs. Observed Event Volume
y = 0.7868x + 0.5885
R2 = 0.9528
Simulated Volume (MG)
Observed Volume (MG)
0
1
2
3
4
5
6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

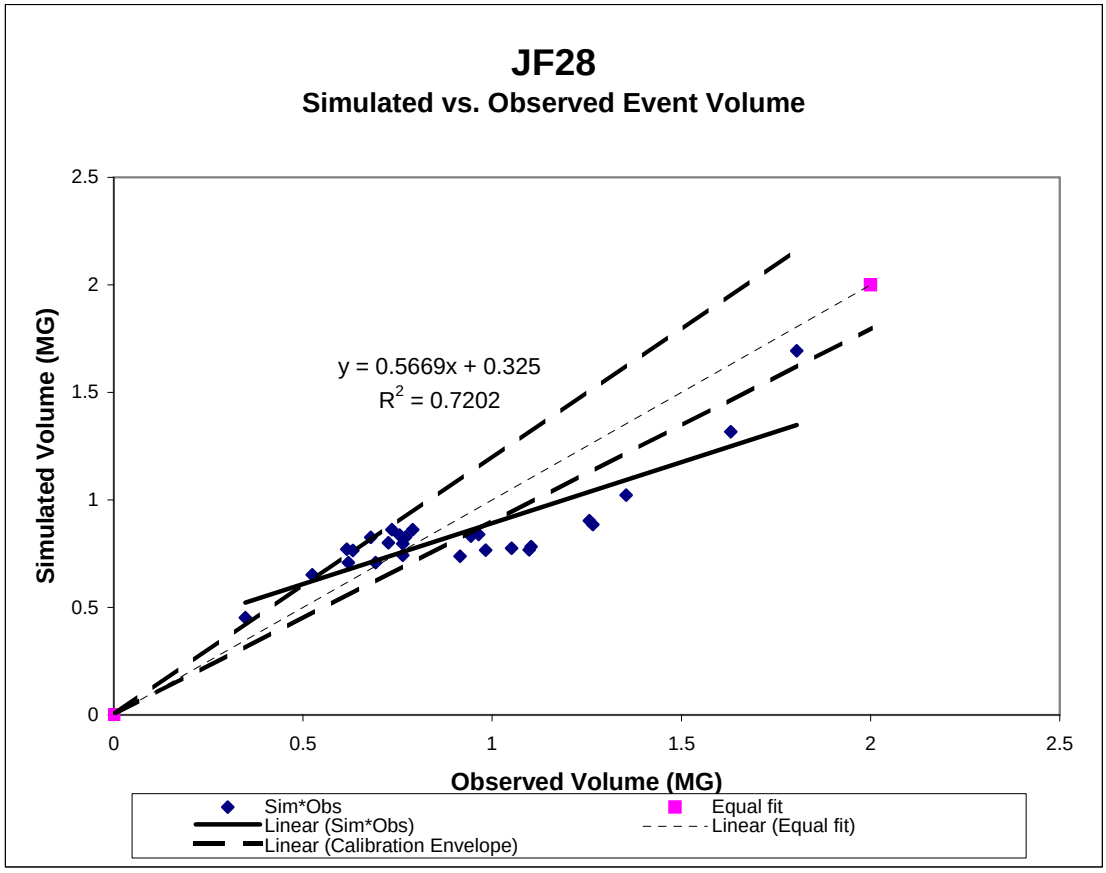

JF26
Simulated vs. Observed Event Peak
y = 0.4829x + 2.3247
R2 = 0.7477
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

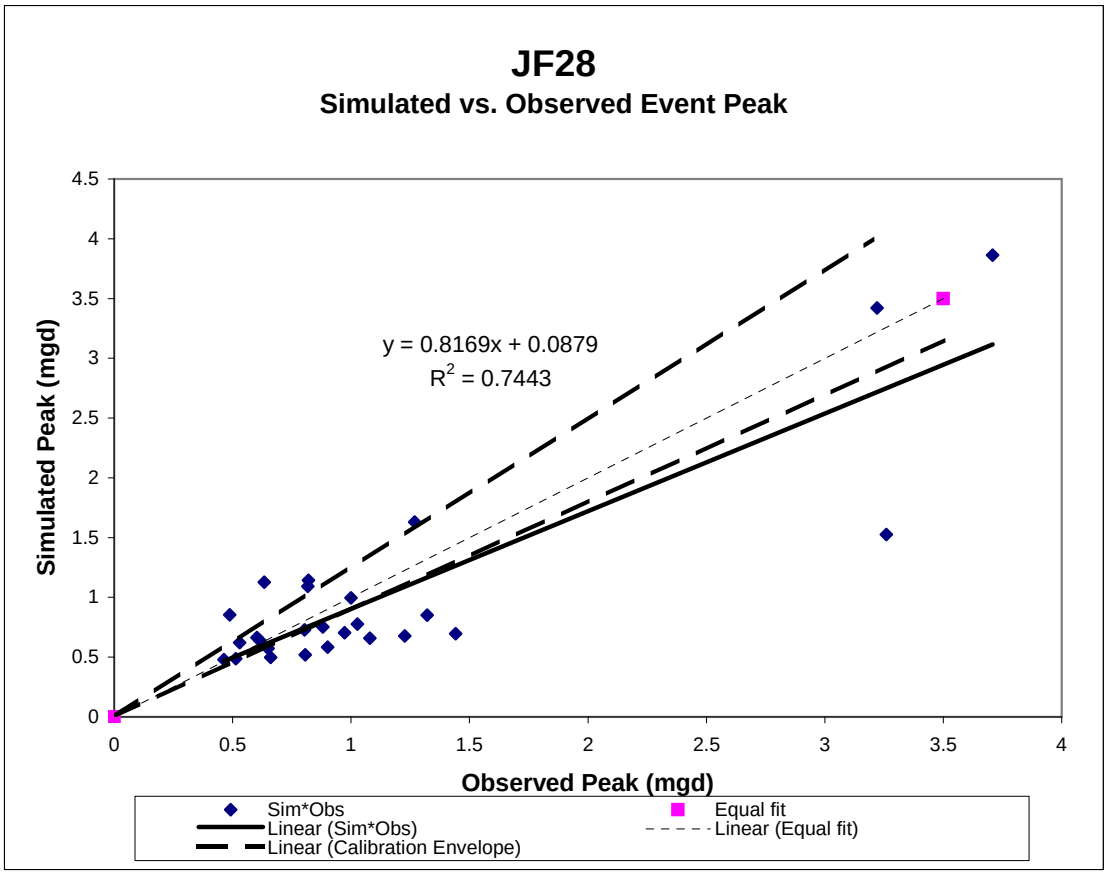
	JF27 15-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.974	1.181	21%	1.216	1.345	11%	0.401	0.41	0.009
June 1, 2006	0.529	0.599	13%	1.464	1.335	-9%	0.442	0.408	-0.034
June 2, 2006	0.87	0.929	7%	2.18	2.095	-4%	0.585	0.519	-0.066
June 19, 2006	1.006	1.02	1%	1.378	0.988	-28%	0.195	0.317	0.122
June 25, 2006	3.300	2.851	-14%	4.690	5.102	9%	6.972	11.545	4.573
July 5, 2006	2.635	1.968	-25%	4.421	4.285	-3%	6.513	8.086	1.573
July 22, 2006	1.158	1.131	-2%	3.239	1.357	-58%	0.991	0.412	-0.579
August 7, 2006	0.94	0.949	1%	0.834	0.667	-20%	0.352	0.286	-0.066
September 1, 2006	1.204	1.235	3%	1.343	1.078	-20%	0.441	0.363	-0.078
September 5, 2006	1.154	1.205	4%	1.673	1.320	-21%	0.483	0.405	-0.078
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007	2.693	1.065	-60%	2.447	0.894	-63%	0.688	0.335	-0.353
March 15, 2007	3.194	1.281	-60%	2.897	0.954	-67%	0.778	0.345	-0.433
April 4, 2007	1.963	0.944	-52%	1.455	0.668	-54%	0.609	0.286	-0.323
April 11, 2007	1.892	0.988	-48%	1.496	0.773	-48%	0.524	0.310	-0.214
April 14, 2007	3.451	1.541	-55%	3.101	1.278	-59%	0.789	0.397	-0.392


JF27
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3547x + 0.6215
R2 = 0.4399
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

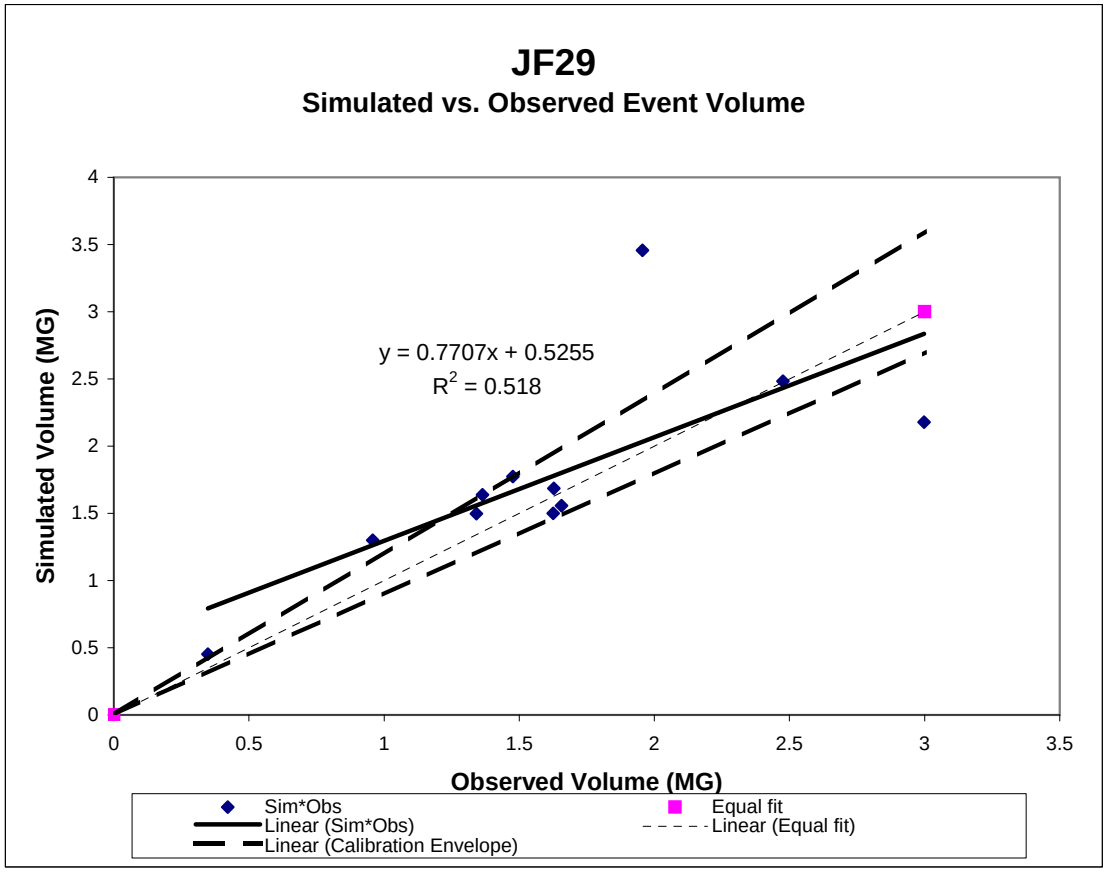

JF27
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.8958x - 0.4113
R2 = 0.6545
0
1
2
3
4
5
6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

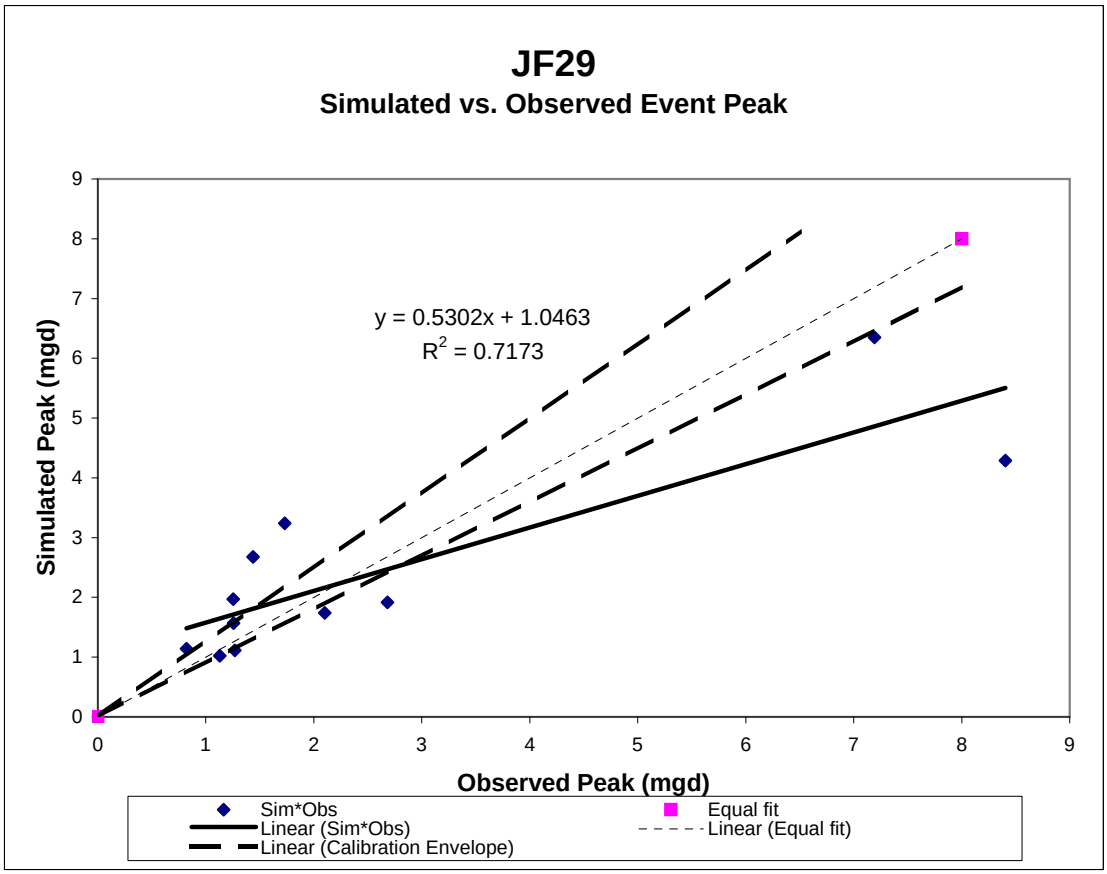
Storm Events	JF28 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.679	0.826	22%	0.817	1.092	34%	0.445	0.548	0.103
June 1, 2006	0.348	0.452	30%	0.820	1.143	39%	0.423	0.560	0.137
June 2, 2006	0.524	0.652	24%	1.268	1.631	29%	0.513	0.669	0.156
June 19, 2006	0.616	0.771	25%	0.487	0.855	76%	0.326	0.489	0.163
June 25, 2006	1.805	1.694	-6%	3.708	3.862	4%	5.481	7.287	1.806
July 5, 2006	1.631	1.317	-19%	3.220	3.420	6%	2.382	2.226	-0.156
July 22, 2006	0.726	0.801	10%	0.634	1.127	78%	0.365	0.557	0.192
August 7, 2006	0.62	0.708	14%	0.463	0.479	3%	0.327	0.364	0.037
September 1, 2006	0.735	0.861	17%	0.804	0.728	-9%	0.433	0.451	0.018
September 5, 2006	0.755	0.837	11%	1.000	0.996	0%	0.417	0.522	0.105
September 14, 2006	0.79	0.861	9%	0.972	0.705	-27%	0.517	0.443	-0.074
September 28, 2006	0.632	0.765	21%	0.530	0.621	17%	0.364	0.415	0.051
October 5, 2006	0.771	0.828	7%	0.603	0.663	10%	0.361	0.430	0.069
October 17, 2006	0.764	0.796	4%	0.615	0.64	4%	0.367	0.422	0.055
October 27, 2006	0.964	0.839	-13%	1.227	0.677	-45%	0.536	0.434	-0.102
November 7, 2006	0.944	0.832	-12%	1.027	0.776	-24%	0.439	0.466	0.027
November 16, 2006	1.257	0.903	-28%	3.260	1.525	-53%	3.011	0.645	-2.366
November 22, 2006	0.915	0.738	-19%	0.661	0.497	-25%	0.342	0.371	0.029
December 22, 2006	0.983	0.767	-22%	0.807	0.52	-36%	0.387	0.38	-0.007
January 1, 2007	1.051	0.776	-26%	0.881	0.751	-15%	0.425	0.458	0.033
January 7, 2007	1.098	0.768	-30%	0.901	0.583	-35%	0.412	0.402	-0.010
March 1, 2007	1.103	0.782	-29%	1.079	0.659	-39%	0.555	0.428	-0.127
March 15, 2007	1.266	0.886	-30%	1.442	0.696	-52%	0.769	0.441	-0.328
April 4, 2007	0.692	0.709	2%	0.513	0.487	-5%	0.404	0.367	-0.037
April 11, 2007	0.764	0.742	-3%	0.650	0.573	-12%	0.466	0.399	-0.067
April 14, 2007	1.354	1.022	-25%	1.321	0.85	-36%	0.833	0.488	-0.345


JF28
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5669x + 0.325
R2 = 0.7202
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

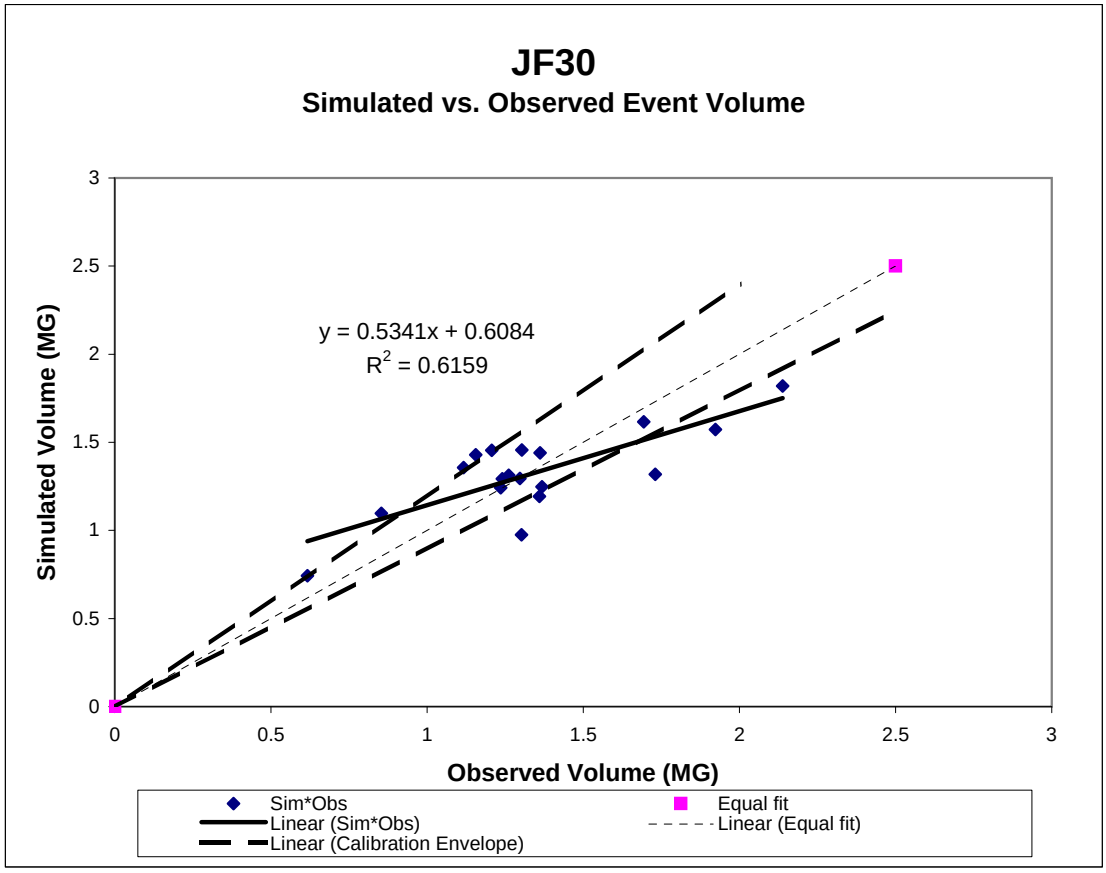

JF28
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.8169x + 0.0879
R2 = 0.7443
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

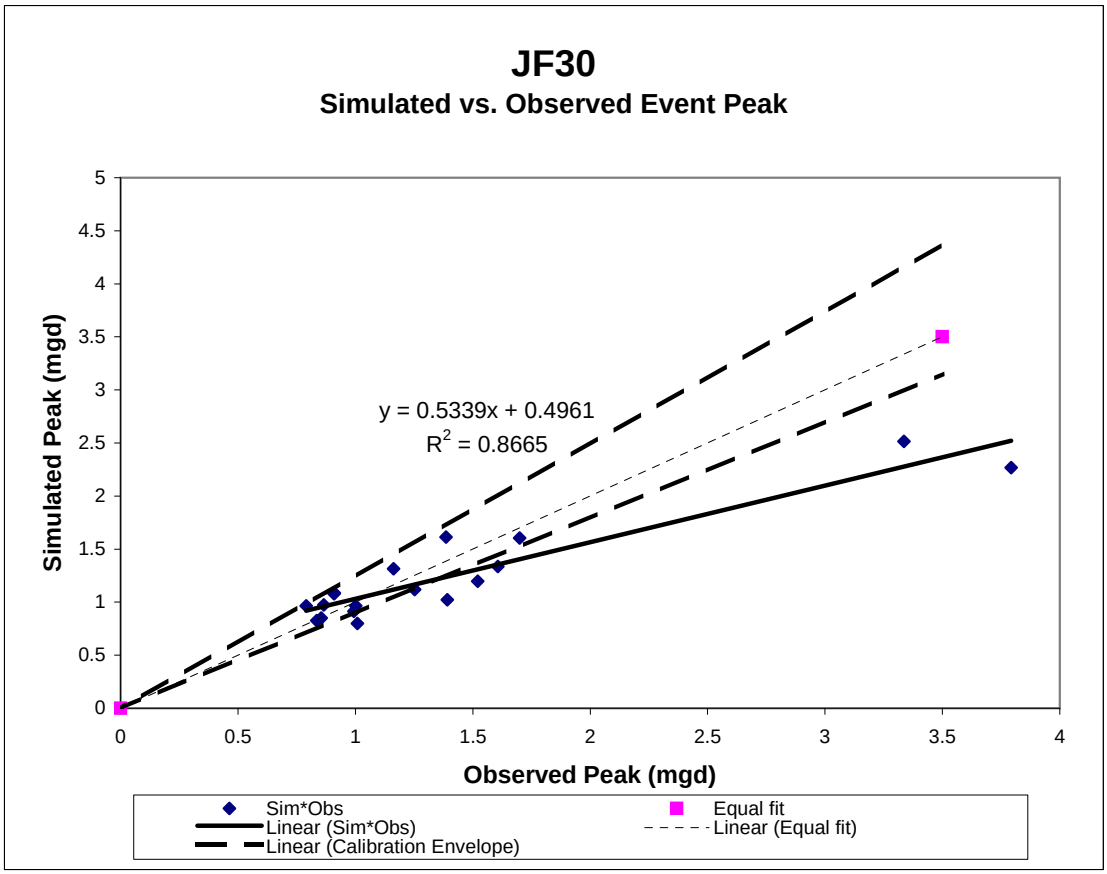
	JF29 21-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.476	1.775	20%	1.254	1.971	57%	0.411	0.343	-0.068
June 1, 2006	0.348	0.452	30%	0.820	1.143	39%	0.423	0.560	0.137
June 2, 2006	0.958	1.299	36%	1.731	3.24	87%	0.422	0.428	0.006
June 19, 2006	1.364	1.638	20%	2.101	1.742	-17%	0.503	0.327	-0.176
June 25, 2006	1.956	3.456	77%	7.193	6.350	-12%	3.968	0.620	-3.348
July 5, 2006	2.476	2.483	0%	8.403	4.287	-49%	1.318	0.494	-0.824
July 22, 2006	1.628	1.686	4%	1.436	2.677	86%	0.396	0.396	0.000
August 7, 2006	1.342	1.498	12%	1.257	1.567	25%	0.369	0.316	-0.053
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007									
March 15, 2007									
April 4, 2007	1.626	1.500	-8%	1.130	1.025	-9%	0.299	0.271	-0.028
April 11, 2007	1.657	1.556	-6%	1.269	1.115	-12%	0.317	0.280	-0.037
April 14, 2007	2.998	2.179	-27%	2.683	1.915	-29%	0.49	0.339	-0.151


JF29
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.7707x + 0.5255
R2 = 0.518
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

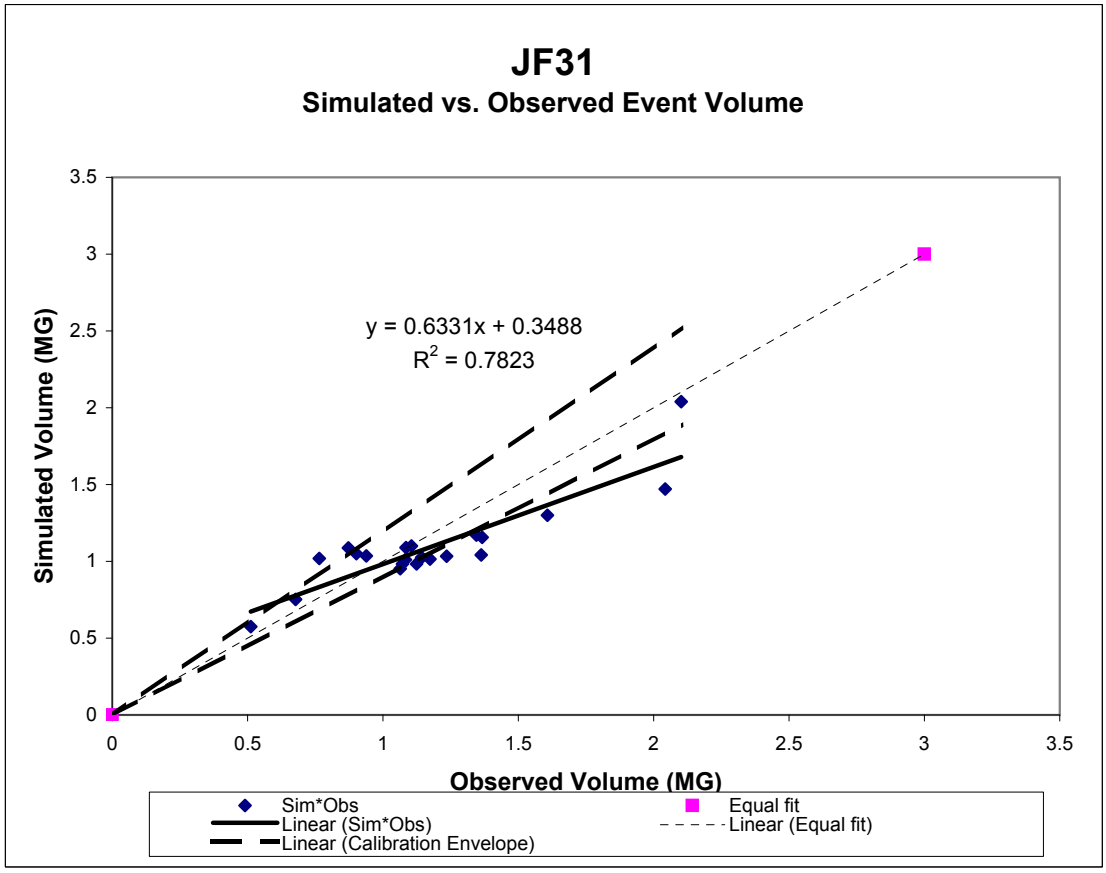

JF29
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.5302x + 1.0463
R2 = 0.7173
0
1
2
3
4
5
6
7
8
9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

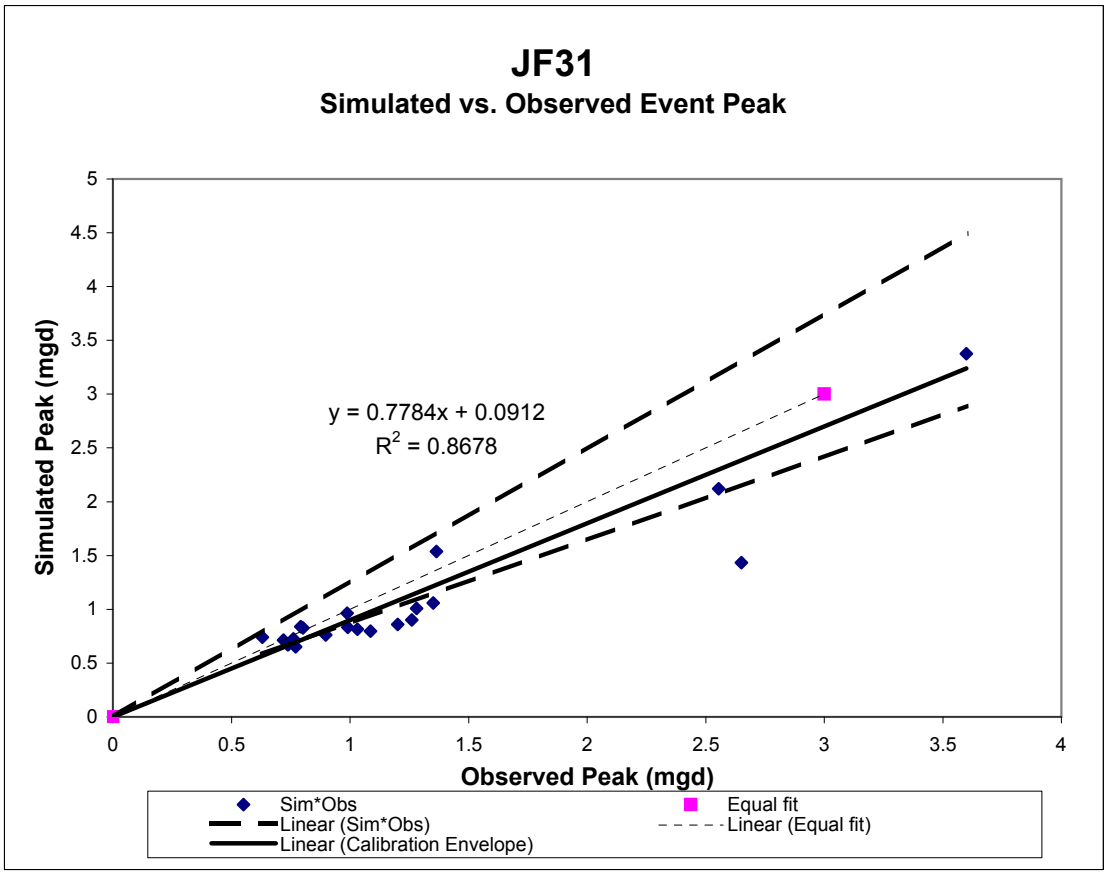
Storm Events	JF30 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.207	1.454	20%	1.386	1.613	16%	0.612	0.414	-0.198
June 1, 2006	0.617	0.742	20%	1.607	1.336	-17%	0.671	0.380	-0.291
June 2, 2006	0.853	1.097	29%	3.336	2.515	-25%	1.337	0.509	-0.828
June 19, 2006									
June 25, 2006									
July 5, 2006									
July 22, 2006									
August 7, 2006									
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006	1.302	0.975	-25%	0.791	0.965	22%	0.323	0.329	0.006
October 5, 2006	1.156	1.430	24%	0.910	1.085	19%	0.330	0.344	0.014
October 17, 2006	1.117	1.356	21%	0.865	0.974	13%	0.312	0.33	0.018
October 27, 2006	1.303	1.456	12%	1.253	1.12	-11%	0.367	0.349	-0.018
November 7, 2006	1.362	1.44	6%	1.162	1.315	13%	0.362	0.377	0.015
November 16, 2006	1.694	1.616	-5%	3.793	2.267	-40%	0.720	0.482	-0.238
November 22, 2006	1.236	1.242	0%	0.836	0.827	-1%	0.288	0.313	0.025
December 22, 2006	1.241	1.293	4%	0.855	0.849	-1%	0.325	0.315	-0.010
January 1, 2007	1.261	1.313	4%	0.909	1.081	19%	0.325	0.344	0.019
January 7, 2007	1.297	1.295	0%	1.002	0.966	-4%	0.33	0.329	-0.001
March 1, 2007	1.731	1.318	-24%	1.392	1.023	-27%	0.397	0.336	-0.061
March 15, 2007	1.923	1.572	-18%	1.521	1.196	-21%	0.413	0.360	-0.053
April 4, 2007	1.360	1.194	-12%	1.009	0.799	-21%	0.368	0.309	-0.059
April 11, 2007	1.368	1.247	-9%	0.994	0.914	-8%	0.358	0.323	-0.035
April 14, 2007	2.138	1.819	-15%	1.7	1.603	-6%	0.443	0.413	-0.030


JF30
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5341x + 0.6084
R2 = 0.6159
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

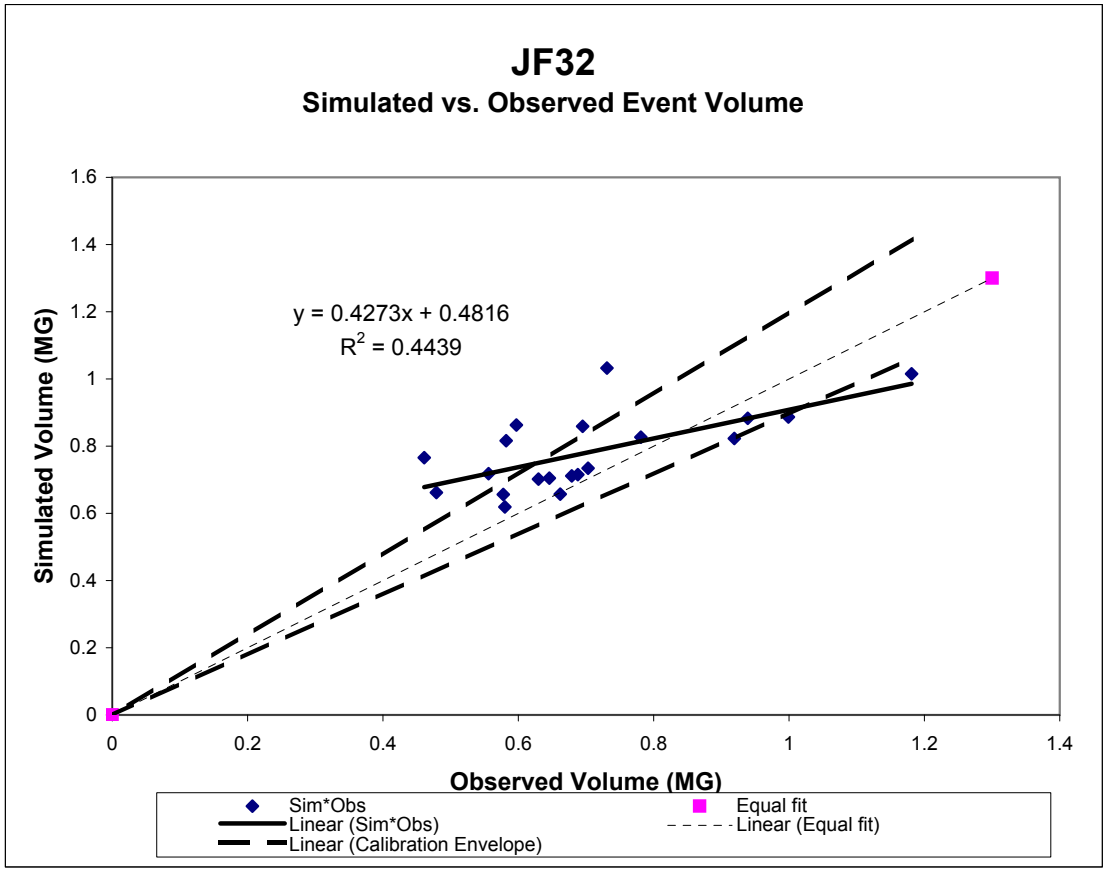

JF30
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.5339x + 0.4961
R2 = 0.8665
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

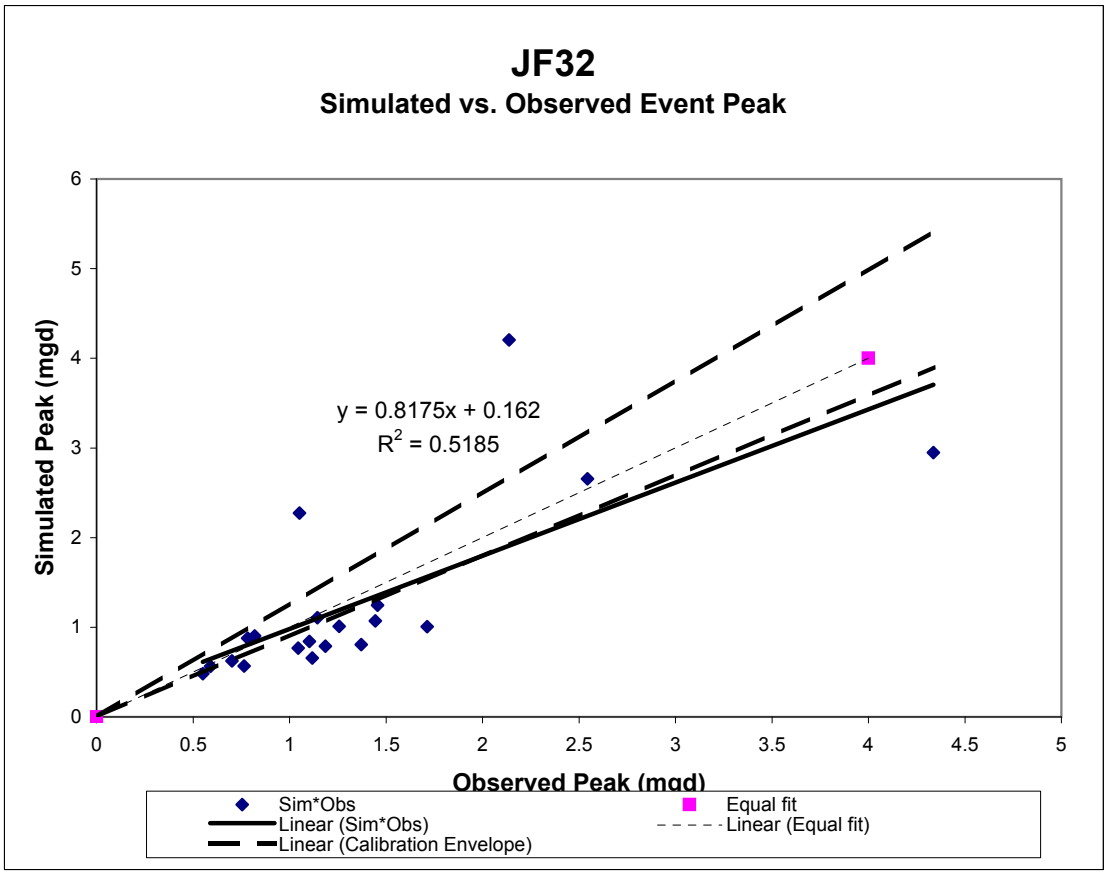
Storm Events	JF31 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006									
June 1, 2006	0.512	0.575	12%	1.281	1.009	-21%	0.365	0.348	-0.017
June 2, 2006	0.677	0.752	11%	1.364	1.539	13%	0.374	0.424	0.050
June 19, 2006	0.939	1.035	10%	0.99	0.833	-16%	0.324	0.32	-0.004
June 25, 2006	2.102	2.039	-3%	3.599	3.375	-6%	0.681	0.631	-0.050
July 5, 2006	2.043	1.471	-28%	2.555	2.122	-17%	0.569	0.496	-0.073
July 22, 2006	1.363	1.042	-24%	1.261	0.902	-28%	0.400	0.332	-0.068
August 7, 2006									
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006	0.765	1.019	33%	0.630	0.740	17%	0.290	0.302	0.012
October 5, 2006	0.872	1.088	25%	0.792	0.839	6%	0.310	0.321	0.011
October 17, 2006	0.902	1.05	16%	0.719	0.714	-1%	0.293	0.297	0.004
October 27, 2006	1.105	1.099	-1%	1.031	0.814	-21%	0.353	0.316	-0.037
November 7, 2006	1.085	1.09	0%	0.988	0.964	-2%	0.351	0.342	-0.009
November 16, 2006	1.345	1.170	-13%	2.651	1.435	-46%	0.590	0.409	-0.181
November 22, 2006	1.124	0.983	-13%	0.737	0.673	-9%	0.280	0.289	0.009
December 22, 2006	1.083	1.01	-7%	0.739	0.671	-9%	0.296	0.288	-0.008
January 1, 2007	1.143	1.026	-10%	0.802	0.827	3%	0.307	0.319	0.012
January 7, 2007	1.174	1.014	-14%	0.898	0.761	-15%	0.327	0.306	-0.021
March 1, 2007	1.235	1.033	-16%	1.086	0.798	-27%	0.346	0.313	-0.033
March 15, 2007	1.367	1.156	-15%	1.201	0.860	-28%	0.366	0.325	-0.041
April 4, 2007	1.064	0.953	-10%	0.770	0.650	-16%	0.299	0.284	-0.015
April 11, 2007	1.072	0.984	-8%	0.761	0.727	-4%	0.298	0.299	0.001
April 14, 2007	1.608	1.299	-19%	1.351	1.059	-22%	0.392	0.354	-0.038


JF31
Simulated vs. Observed Event Volume
y = 0.6331x + 0.3488
R2 = 0.7823
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

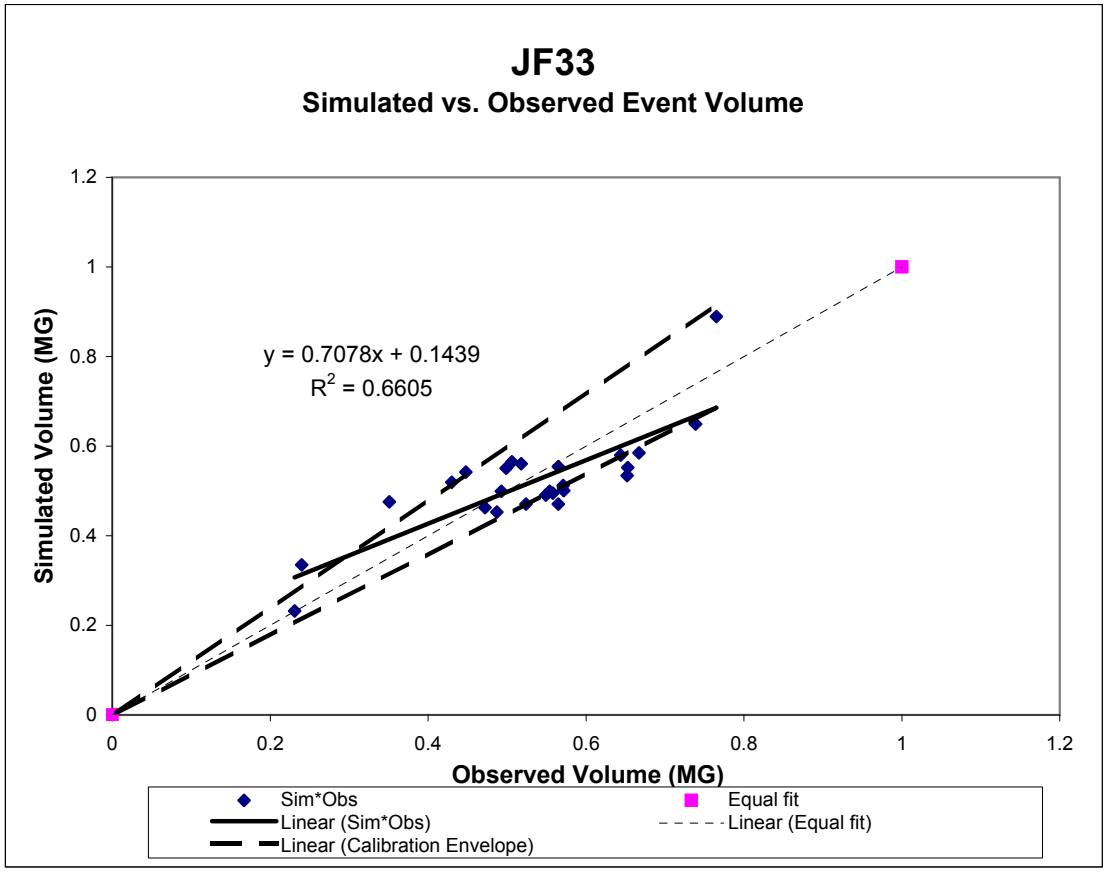

JF31
Simulated vs. Observed Event Peak
y = 0.7784x + 0.0912
R2 = 0.8678
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

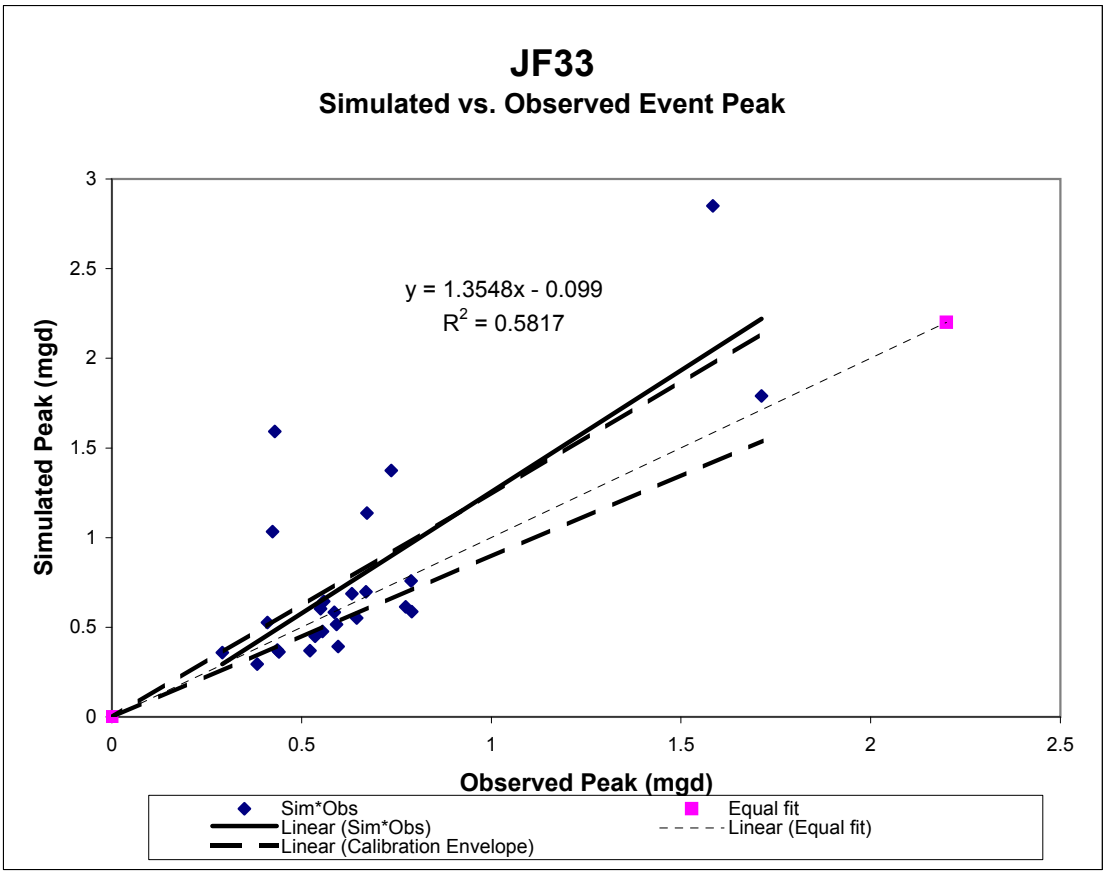
Storm Events	JF32 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006									
June 1, 2006									
June 2, 2006									
June 19, 2006									
June 25, 2006									
July 5, 2006	0.731	1.032	41%	2.137	4.205	97%	0.476	0.629	0.153
July 22, 2006	0.461	0.766	66%	2.544	2.654	4%	0.704	0.460	-0.244
August 7, 2006	0.479	0.662	38%	1.186	0.79	-33%	0.427	0.251	-0.176
September 1, 2006	0.695	0.859	24%	0.819	0.902	10%	0.289	0.267	-0.022
September 5, 2006	0.597	0.863	45%	1.051	2.274	116%	0.341	0.423	0.082
September 14, 2006	0.582	0.816	40%	0.782	0.878	12%	0.304	0.264	-0.040
September 28, 2006	0.556	0.718	29%	1.145	1.108	-3%	0.372	0.289	-0.083
October 5, 2006	0.781	0.827	6%	1.372	0.808	-41%	0.391	0.253	-0.138
October 17, 2006	0.703	0.734	4%	1.103	0.841	-24%	0.362	0.258	-0.104
October 27, 2006	0.919	0.823	-10%	1.713	1.008	-41%	0.378	0.279	-0.099
November 7, 2006									
November 16, 2006	0.939	0.883	-6%	4.336	2.950	-32%	0.902	0.494	-0.408
November 22, 2006	0.578	0.656	13%	0.591	0.564	-5%	0.237	0.217	-0.020
December 22, 2006	0.679	0.711	5%	1.117	0.656	-41%	0.321	0.229	-0.092
January 1, 2007	0.646	0.705	9%	1.445	1.071	-26%	0.389	0.285	-0.104
January 7, 2007	0.63	0.702	11%	0.702	0.626	-11%	0.248	0.225	-0.023
March 1, 2007	0.688	0.715	4%	1.045	0.769	-26%	0.300	0.247	-0.053
March 15, 2007	0.999	0.887	-11%	1.257	1.009	-20%	0.376	0.279	-0.097
April 4, 2007	0.580	0.619	7%	0.551	0.482	-13%	0.208	0.206	-0.002
April 11, 2007	0.662	0.657	-1%	0.764	0.567	-26%	0.261	0.217	-0.044
April 14, 2007	1.181	1.015	-14%	1.456	1.246	-14%	0.389	0.305	-0.084


JF32
Simulated vs. Observed Event Volume
y = 0.4273x + 0.4816
R2 = 0.4439
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

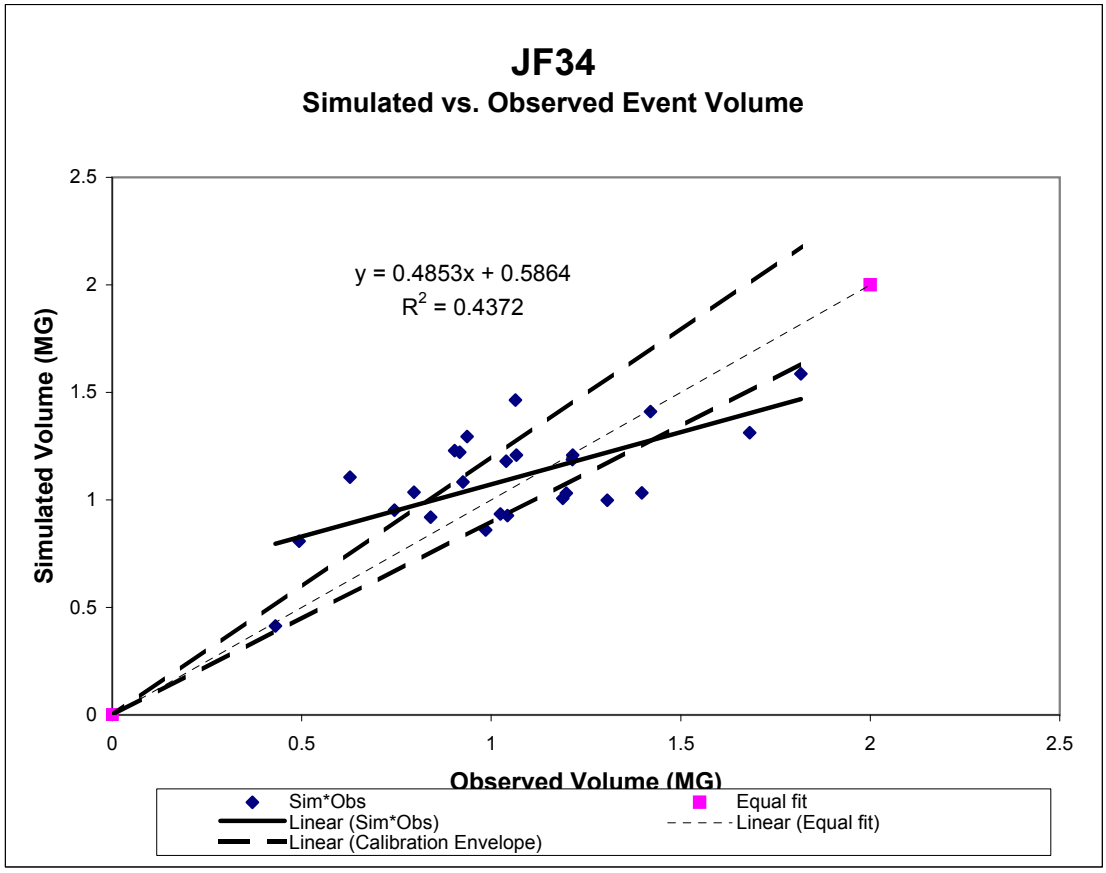

JF32
Simulated vs. Observed Event Peak
y = 0.8175x + 0.162
R2 = 0.5185
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
0.5
1.5
2.5
3.5
4.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

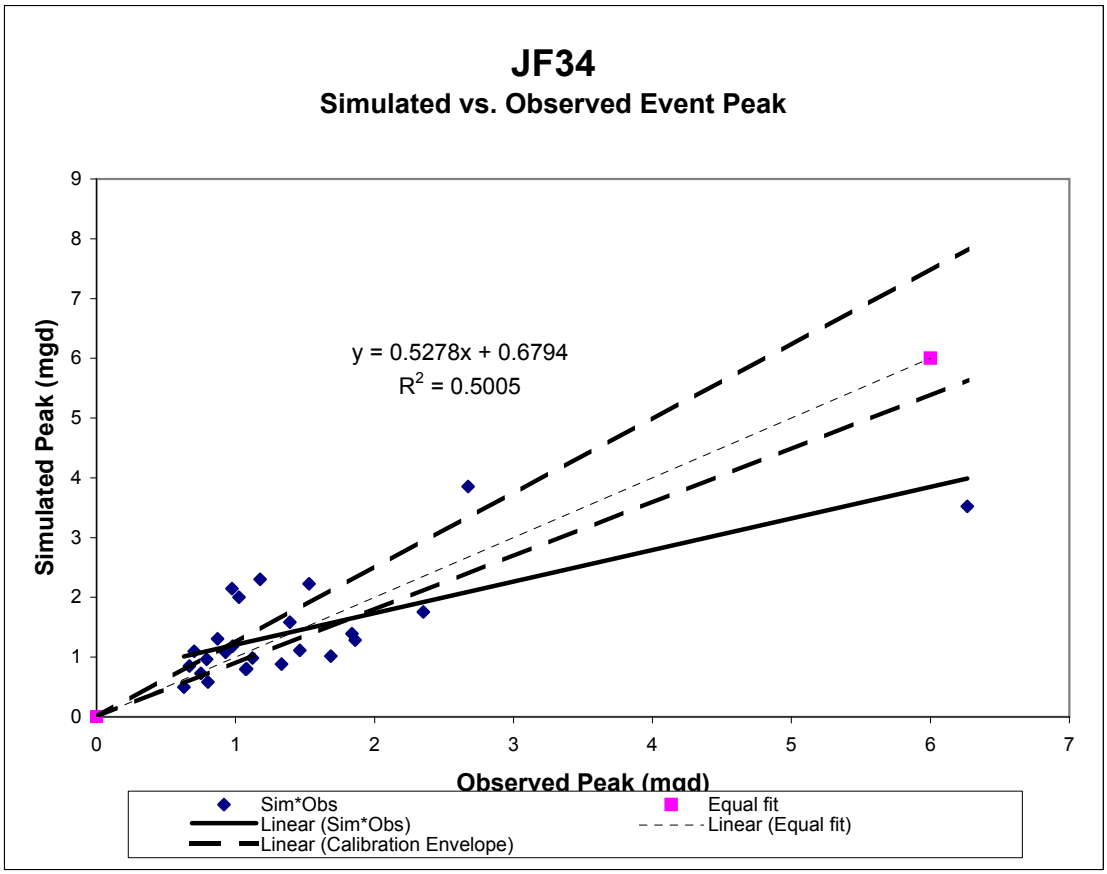
	JF33 12-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.448	0.542	21%	0.736	1.374	87%	0.454	0.627	0.173
June 1, 2006	0.231	0.232	0%	0.291	0.358	23%	0.258	0.296	0.038
June 2, 2006	0.24	0.335	40%	0.423	1.033	144%	0.31	0.541	0.231
June 19, 2006	0.472	0.463	-2%	0.55	0.603	10%	0.389	0.411	0.022
June 25, 2006	0.765	0.889	16%	1.584	2.850	80%	7.327	1.367	-5.960
July 5, 2006									
July 22, 2006	0.430	0.519	21%	0.429	1.592	271%	0.521	0.676	0.155
August 7, 2006	0.351	0.476	36%	0.645	0.551	-15%	0.579	0.378	-0.201
September 1, 2006	0.506	0.565	12%	0.410	0.526	28%	0.295	0.366	0.071
September 5, 2006	0.518	0.561	8%	0.672	1.137	69%	0.417	0.569	0.152
September 14, 2006	0.499	0.551	10%	0.79	0.588	-26%	0.435	0.406	-0.029
September 28, 2006	0.493	0.499	1%	0.633	0.687	9%	0.424	0.439	0.015
October 5, 2006	0.565	0.554	-2%	0.536	0.450	-16%	0.360	0.341	-0.019
October 17, 2006	0.571	0.512	-10%	0.592	0.515	-13%	0.375	0.362	-0.013
October 27, 2006	0.653	0.552	-15%	0.774	0.614	-21%	0.446	0.415	-0.031
November 7, 2006	0.652	0.534	-18%	0.789	0.759	-4%	0.438	0.462	0.024
November 16, 2006	0.667	0.585	-12%	1.712	1.790	5%	0.812	0.717	-0.095
November 22, 2006	0.565	0.471	-17%	0.440	0.363	-18%	0.349	0.298	-0.051
December 22, 2006	0.554	0.499	-10%	0.596	0.393	-34%	0.394	0.313	-0.081
January 1, 2007	0.558	0.495	-11%	0.558	0.645	16%	0.359	0.425	0.066
January 7, 2007	0.549	0.491	-11%	0.436	0.373	-14%	0.324	0.303	-0.021
March 1, 2007	0.572	0.501	-12%	0.555	0.477	-14%	0.384	0.351	-0.033
March 15, 2007	0.644	0.580	-10%	0.586	0.584	0%	0.395	0.403	0.008
April 4, 2007	0.487	0.453	-7%	0.383	0.295	-23%	0.319	0.273	-0.046
April 11, 2007	0.524	0.471	-10%	0.522	0.369	-29%	0.321	0.301	-0.020
April 14, 2007	0.739	0.649	-12%	0.67	0.698	4%	0.403	0.443	0.040


JF33
Simulated vs. Observed Event Volume
y = 0.7078x + 0.1439
R2 = 0.6605
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

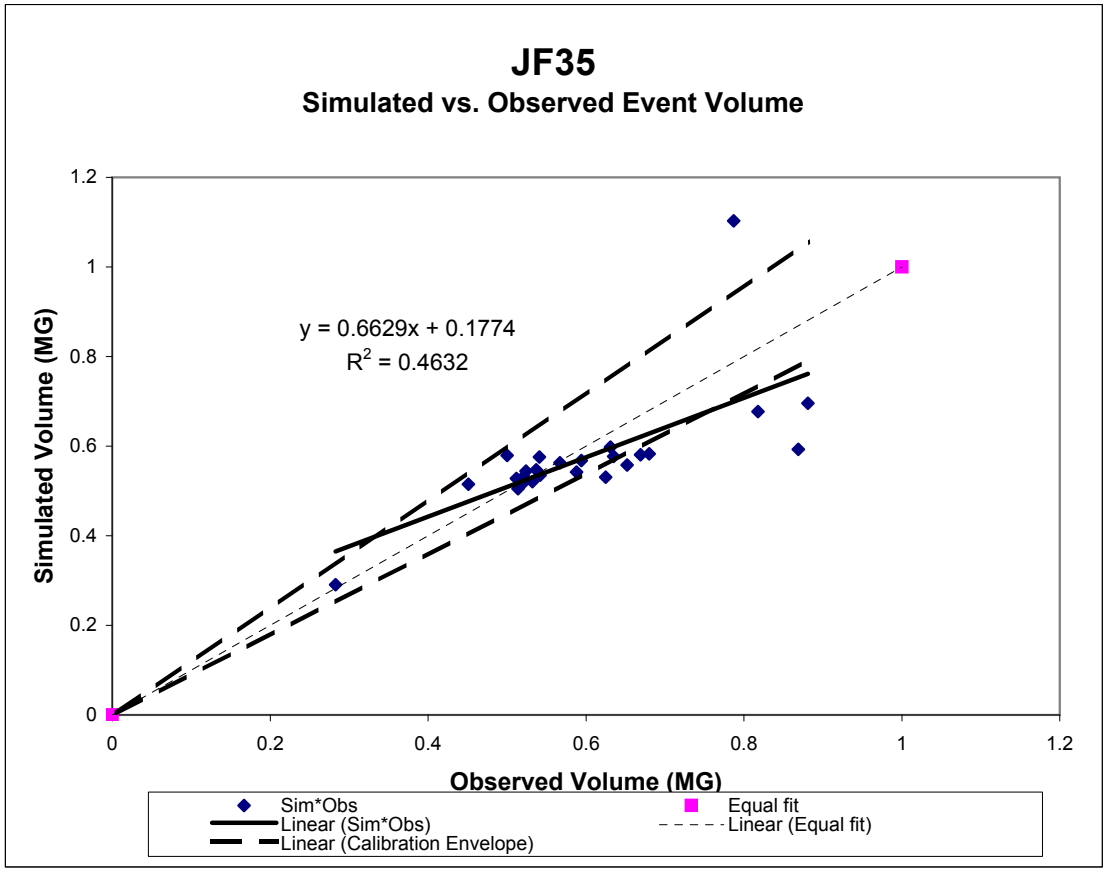

JF33
Simulated vs. Observed Event Peak
y = 1.3548x - 0.099
R2 = 0.5817
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

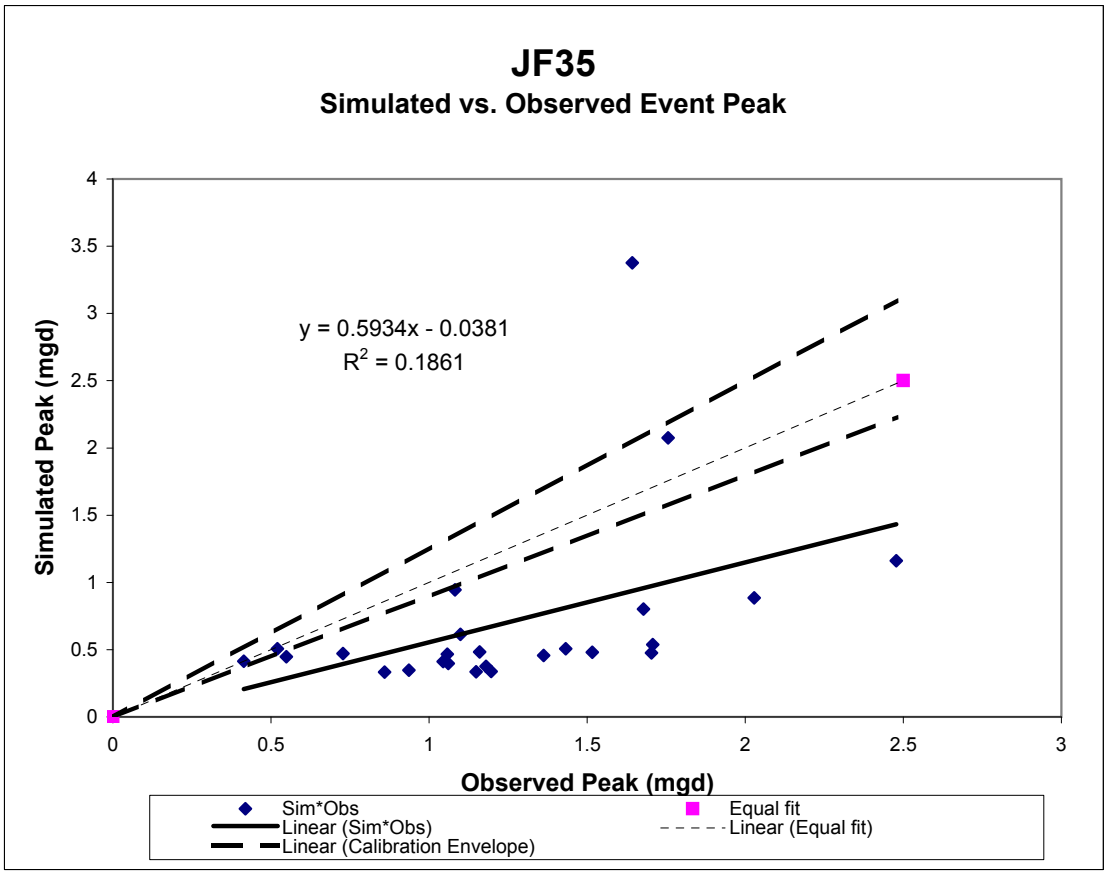
	JF34 18-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.917	1.222	33%	1.176	2.3	96%	0.333	0.381	0.048
June 1, 2006	0.431	0.414	-4%	0.628	0.498	-21%	0.213	0.202	-0.011
June 2, 2006	0.493	0.808	64%	0.975	2.148	120%	0.288	0.365	0.077
June 19, 2006	0.84	0.92	10%	0.792	0.966	22%	0.258	0.256	-0.002
June 25, 2006									
July 5, 2006	1.064	1.464	38%	2.674	3.853	44%	0.848	0.502	-0.346
July 22, 2006	0.627	1.105	76%	1.024	2.005	96%	0.329	0.351	0.022
August 7, 2006	0.745	0.952	28%	0.667	0.853	28%	0.25	0.246	-0.004
September 1, 2006	0.936	1.294	38%	0.870	1.304	50%	0.272	0.293	0.021
September 5, 2006	0.903	1.229	36%	1.528	2.228	46%	0.372	0.373	0.001
September 14, 2006	1.039	1.18	14%	1.122	0.983	-12%	0.311	0.258	-0.053
September 28, 2006	0.796	1.035	30%	0.702	1.098	56%	0.241	0.269	0.028
October 5, 2006	1.066	1.208	13%	0.928	1.080	16%	0.270	0.267	-0.003
October 17, 2006	0.925	1.083	17%	0.979	1.185	21%	0.292	0.279	-0.013
October 27, 2006	1.215	1.209	0%	1.837	1.39	-24%	0.365	0.302	-0.063
November 7, 2006	1.214	1.188	-2%	1.391	1.587	14%	0.352	0.32	-0.032
November 16, 2006	1.420	1.411	-1%	6.265	3.521	-44%	1.043	0.482	-0.561
November 22, 2006	1.043	0.927	-11%	0.751	0.727	-3%	0.248	0.233	-0.015
December 22, 2006	1.198	1.031	-14%	1.33	0.884	-34%	0.336	0.249	-0.087
January 1, 2007	1.189	1.008	-15%	1.462	1.113	-24%	0.328	0.271	-0.057
January 7, 2007	1.306	0.998	-24%	1.08	0.802	-26%	0.321	0.241	-0.080
March 1, 2007	1.397	1.033	-26%	1.685	1.016	-40%	0.365	0.261	-0.104
March 15, 2007	1.682	1.312	-22%	1.860	1.285	-31%	0.413	0.291	-0.122
April 4, 2007	0.985	0.860	-13%	0.801	0.585	-27%	0.268	0.215	-0.053
April 11, 2007	1.024	0.934	-9%	1.073	0.796	-26%	0.271	0.240	-0.031
April 14, 2007	1.817	1.587	-13%	2.352	1.754	-25%	0.456	0.332	-0.124


JF34
Simulated vs. Observed Event Volume
y = 0.4853x + 0.5864
R2 = 0.4372
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

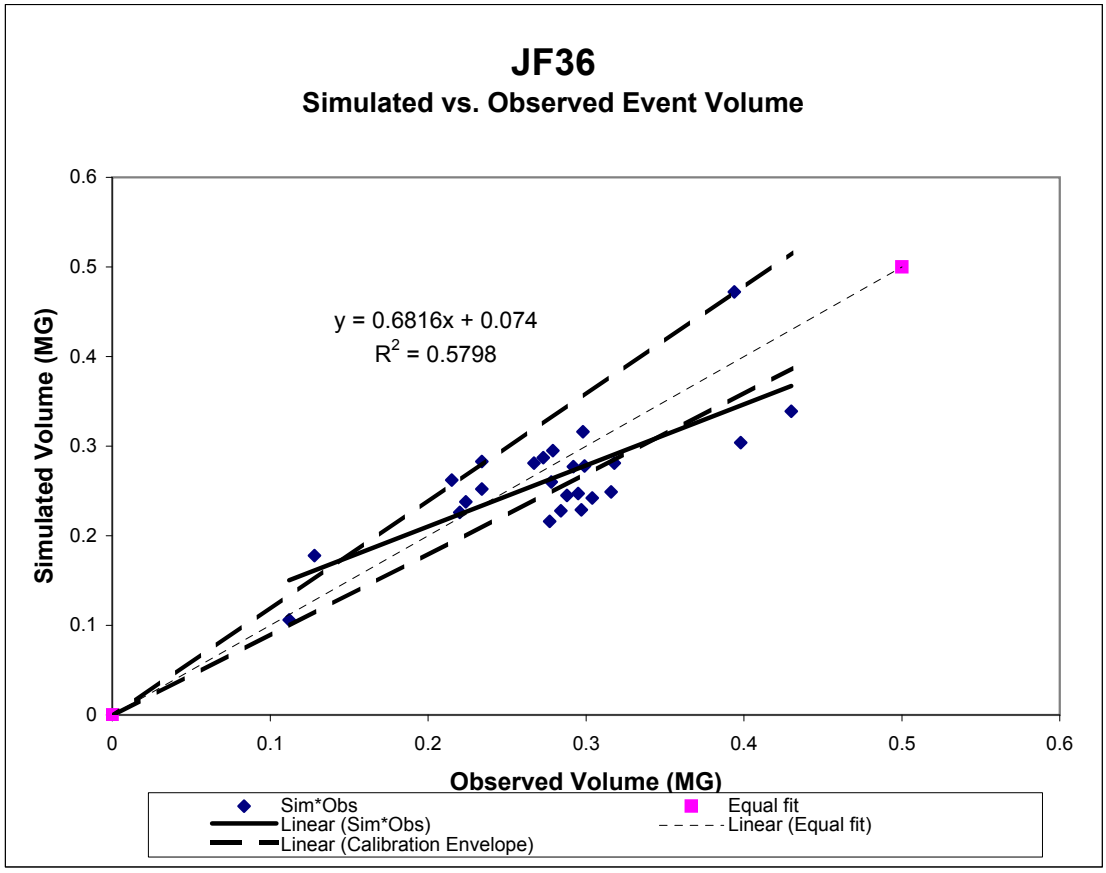

JF34
Simulated vs. Observed Event Peak
y = 0.5278x + 0.6794
R2 = 0.5005
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
8
9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

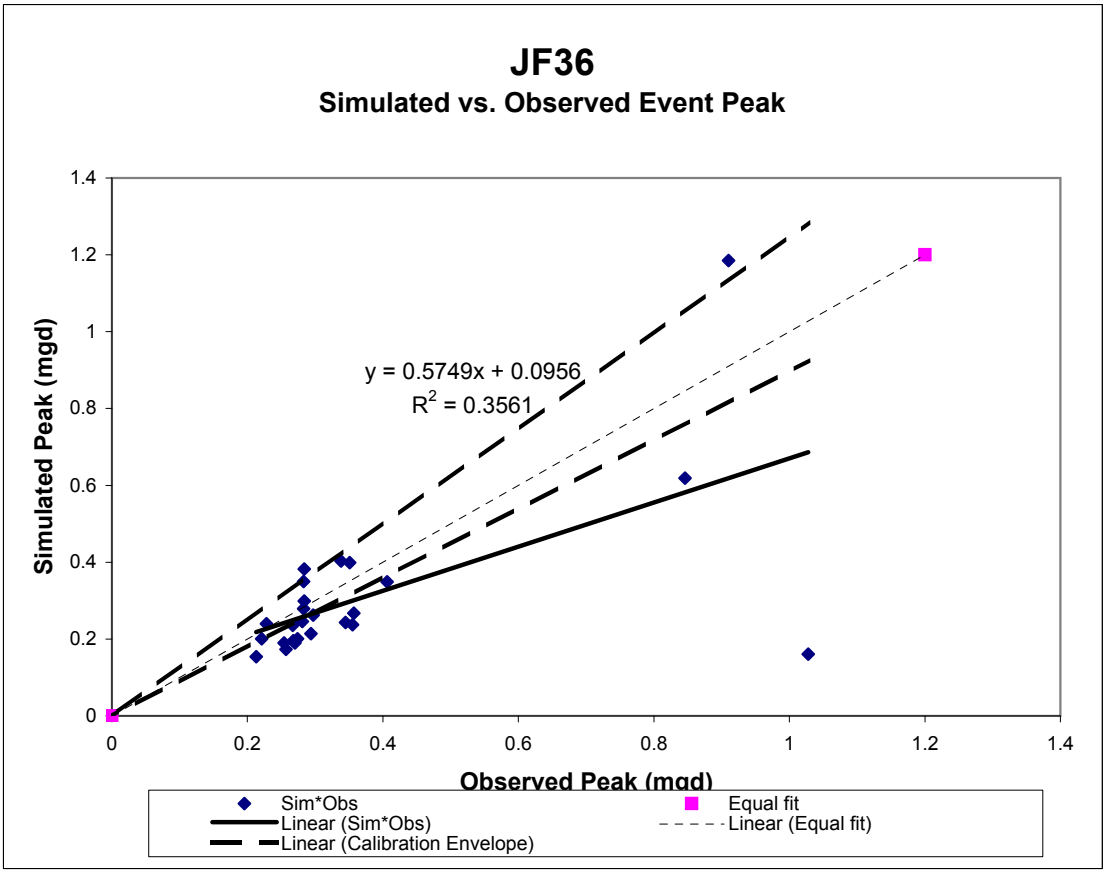
Storm Events	JF35 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.594	0.568	-4%	1.432	0.508	-65%	1.073	0.337	-0.736
June 1, 2006	0.283	0.291	3%	0.859	0.332	-61%	3.070	0.272	-2.798
June 2, 2006	0.500	0.579	16%	1.099	0.613	-44%	3.340	0.367	-2.973
June 19, 2006	0.451	0.515	14%	1.149	0.335	-71%	1.061	0.274	-0.787
June 25, 2006	0.787	1.103	40%	1.643	3.377	106%	3.340	4.515	1.175
July 5, 2006	0.818	0.677	-17%	1.756	2.075	18%	3.271	4.425	1.154
July 22, 2006	0.652	0.558	-14%	2.028	0.884	-56%	1.314	0.459	-0.855
August 7, 2006	0.512	0.528	3%	1.058	0.466	-56%	0.389	0.319	-0.070
September 1, 2006	0.680	0.583	-14%	0.728	0.472	-35%	0.665	0.322	-0.343
September 5, 2006	0.669	0.581	-13%	1.678	0.803	-52%	1.085	0.426	-0.659
September 14, 2006									
September 28, 2006	0.524	0.544	4%	1.516	0.480	-68%	1.235	0.325	-0.910
October 5, 2006	0.541	0.576	6%	1.362	0.458	-66%	1.187	0.315	-0.872
October 17, 2006	0.537	0.547	2%	1.045	0.412	-61%	1.045	0.300	-0.745
October 27, 2006	0.635	0.577	-9%	1.703	0.477	-72%	1.449	0.324	-1.125
November 7, 2006	0.567	0.563	-1%	1.707	0.538	-68%	1.172	0.347	-0.825
November 16, 2006	0.869	0.593	-32%	2.478	1.161	-53%	2.105	0.549	-1.556
November 22, 2006	0.520	0.517	-1%	0.936	0.347	-63%	1.040	0.279	-0.761
December 22, 2006	0.521	0.532	2%	0.414	0.414	0%	0.275	0.301	0.026
January 1, 2007	0.542	0.535	-1%	0.520	0.506	-3%	1.417	0.336	-1.081
January 7, 2007	0.625	0.531	-15%	1.061	0.398	-62%	0.988	0.296	-0.692
March 1, 2007	0.588	0.542	-8%	0.549	0.448	-18%	1.106	0.312	-0.794
March 15, 2007	0.631	0.598	-5%	1.160	0.483	-58%	1.093	0.326	-0.767
April 4, 2007	0.514	0.505	-2%	1.196	0.337	-72%	1.088	0.275	-0.813
April 11, 2007	0.532	0.521	-2%	1.180	0.375	-68%	1.083	0.289	-0.794
April 14, 2007	0.881	0.696	-21%	1.082	0.944	-13%	1.127	0.478	-0.649


JF35
Simulated vs. Observed Event Volume
y = 0.6629x + 0.1774
R2 = 0.4632
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

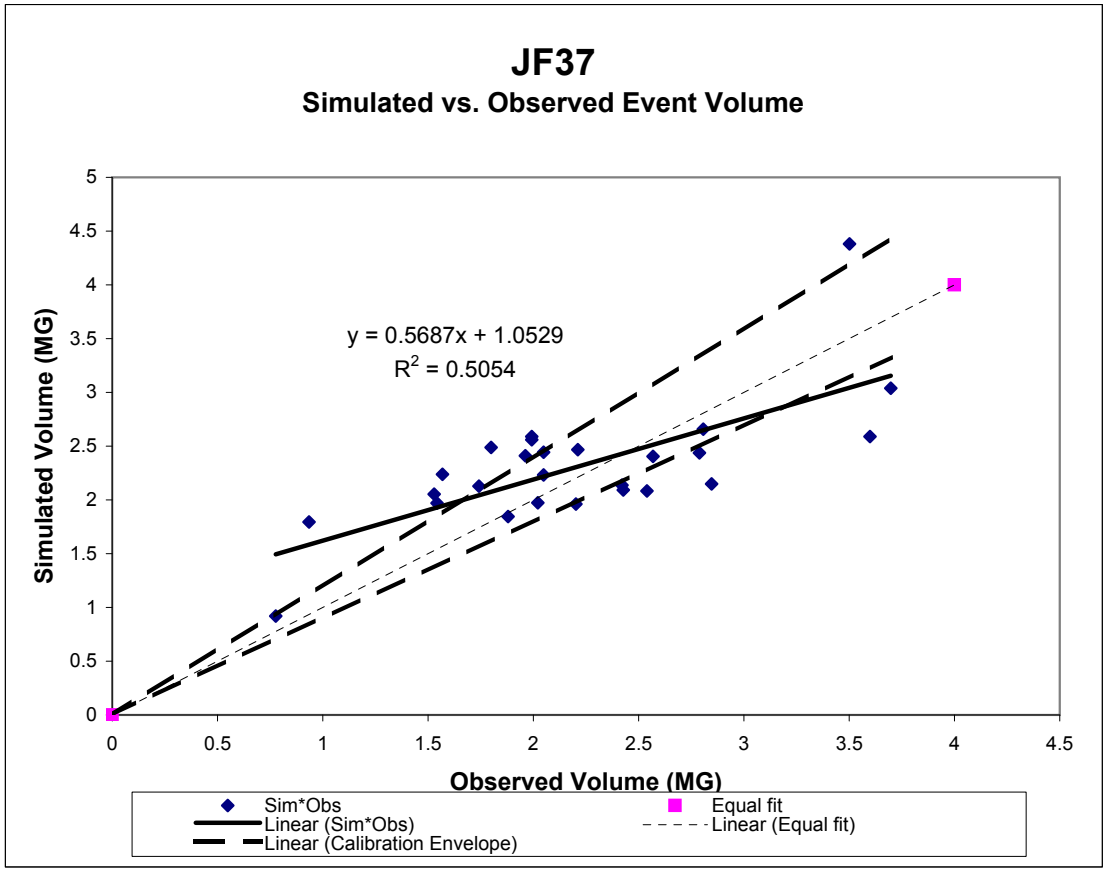

JF35
Simulated vs. Observed Event Peak
y = 0.5934x - 0.0381
R2 = 0.1861
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

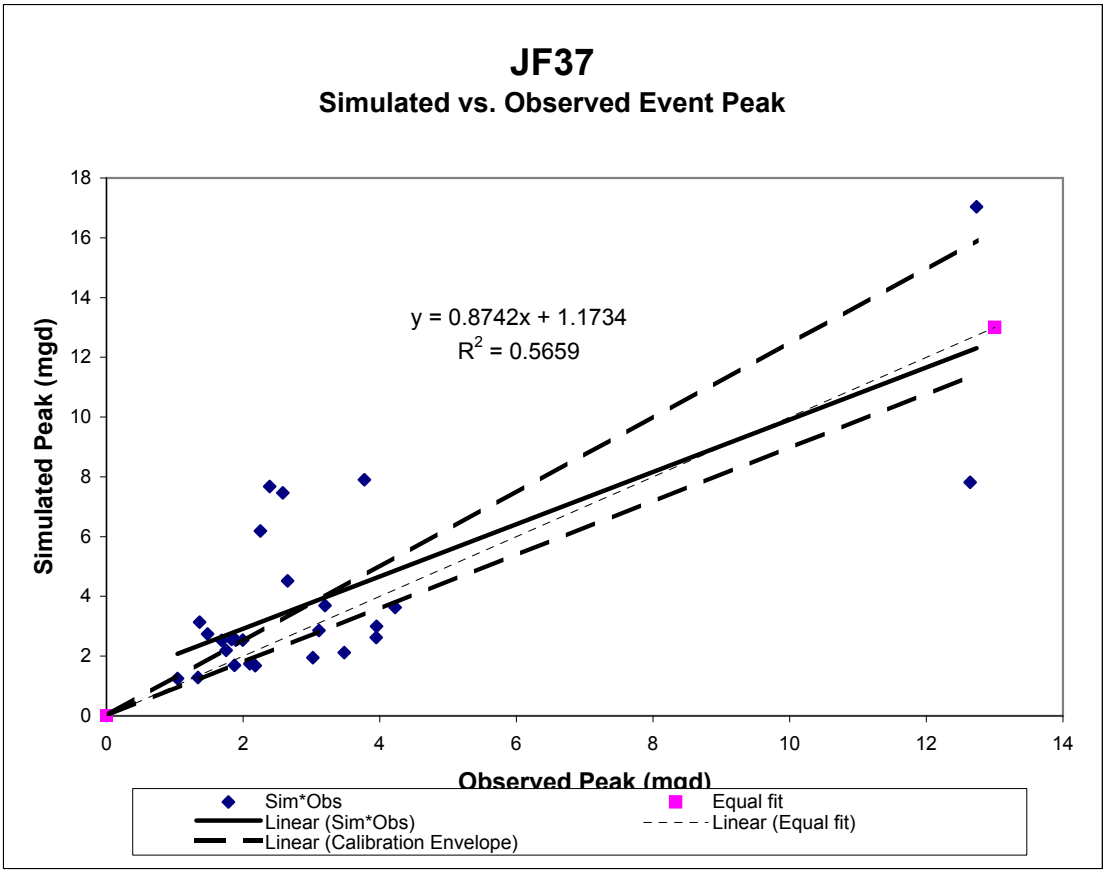
Storm Events	JF36 8-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.234	0.283	21%	0.351	0.399	14%	0.229	0.217	-0.012
June 1, 2006	0.112	0.106	-5%	0.213	0.154	-28%	0.169	0.142	-0.027
June 2, 2006	0.128	0.178	39%	0.284	0.382	35%	0.197	0.211	0.014
June 19, 2006	0.22	0.226	3%	0.254	0.19	-25%	0.192	0.154	-0.038
June 25, 2006	0.394	0.472	20%	0.910	1.185	30%	0.495	0.903	0.408
July 5, 2006									
July 22, 2006	0.215	0.262	22%	0.283	0.350	24%	0.214	0.201	-0.013
August 7, 2006	0.224	0.238	6%	0.274	0.201	-27%	0.209	0.158	-0.051
September 1, 2006	0.279	0.295	6%	0.283	0.279	-1%	0.209	0.184	-0.025
September 5, 2006	0.273	0.287	5%	0.338	0.403	19%	0.237	0.218	-0.019
September 14, 2006	0.299	0.278	-7%	0.294	0.214	-27%	0.21	0.162	-0.048
September 28, 2006	0.234	0.252	8%	0.228	0.240	5%	0.185	0.172	-0.013
October 5, 2006	0.267	0.281	5%	0.267	0.236	-12%	0.212	0.170	-0.042
October 17, 2006	0.278	0.26	-6%	0.281	0.246	-12%	0.203	0.174	-0.029
October 27, 2006	0.318	0.281	-12%	0.297	0.262	-12%	0.219	0.179	-0.040
November 7, 2006	0.292	0.277	-5%	0.284	0.299	5%	0.22	0.188	-0.032
November 16, 2006	0.298	0.316	6%	0.846	0.619	-27%	0.749	0.275	-0.474
November 22, 2006	0.284	0.228	-20%	0.257	0.173	-33%	0.195	0.148	-0.047
December 22, 2006	0.295	0.247	-16%	0.27	0.19	-30%	0.211	0.154	-0.057
January 1, 2007	0.288	0.245	-15%	0.345	0.243	-30%	0.223	0.173	-0.050
January 7, 2007	0.304	0.242	-20%	0.268	0.196	-27%	0.174	0.156	-0.018
March 1, 2007	0.316	0.249	-21%	0.355	0.237	-33%	0.209	0.171	-0.038
March 15, 2007	0.398	0.304	-24%	0.357	0.267	-25%	0.217	0.180	-0.037
April 4, 2007	0.277	0.216	-22%	1.028	0.161	-84%	0.467	0.144	-0.323
April 11, 2007	0.297	0.229	-23%	0.221	0.201	-9%	0.163	0.158	-0.005
April 14, 2007	0.43	0.339	-21%	0.406	0.349	-14%	0.237	0.201	-0.036


JF36
Simulated vs. Observed Event Volume
y = 0.6816x + 0.074
R2 = 0.5798
Simulated Volume (MG)
Observed Volume (MG)
0
0.1
0.2
0.3
0.4
0.5
0.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

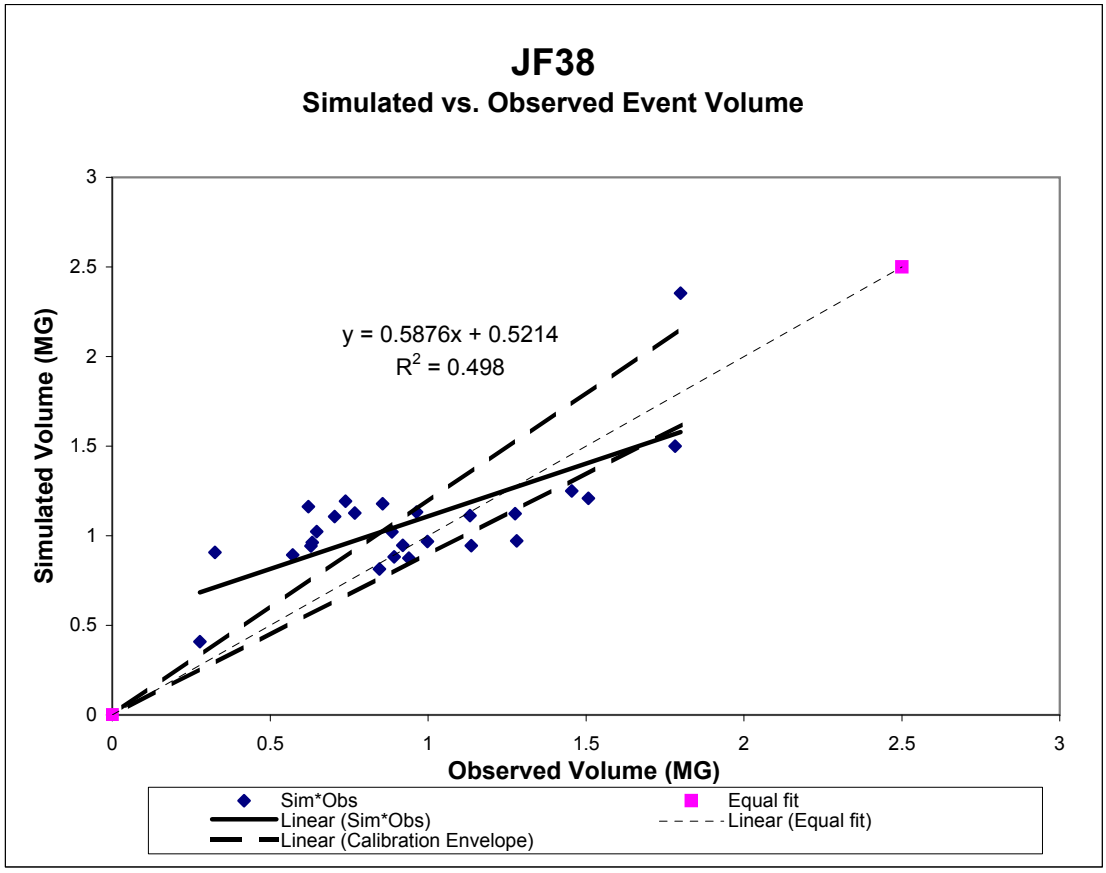

JF36
Simulated vs. Observed Event Peak
y = 0.5749x + 0.0956
R2 = 0.3561
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

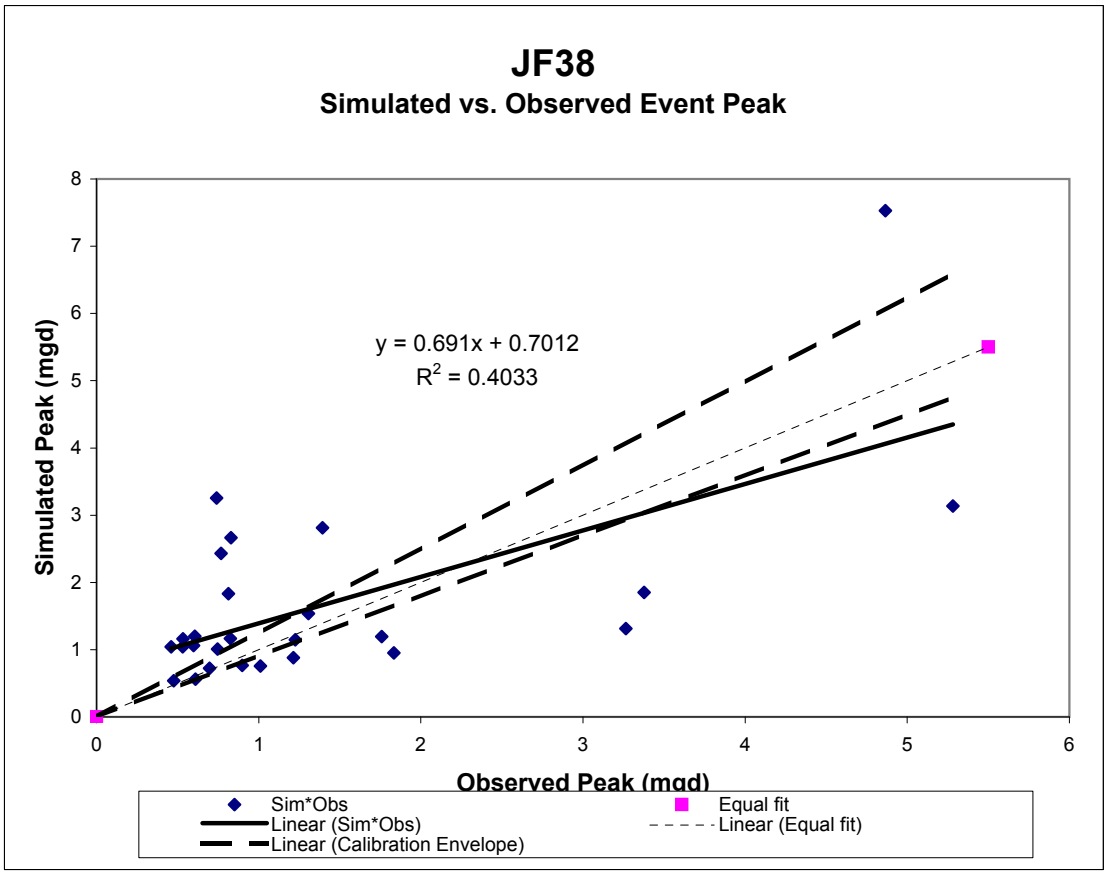
Storm Events	JF37 21-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.8	2.489	38%	2.581	7.462	189%	0.526	0.799	0.273
June 1, 2006	0.777	0.919	18%	1.040	1.255	21%	0.325	0.356	0.031
June 2, 2006	0.934	1.795	92%	2.253	6.192	175%	0.483	0.73	0.247
June 19, 2006	1.543	1.971	28%	1.365	3.134	130%	0.383	0.517	0.134
June 25, 2006	3.501	4.382	25%	12.735	17.033	34%	1.542	1.900	0.358
July 5, 2006	1.992	2.589	30%	3.773	7.905	110%	0.622	0.832	0.210
July 22, 2006	1.568	2.237	43%	2.387	7.676	222%	0.511	0.815	0.304
August 7, 2006	1.529	2.055	34%	1.893	2.541	34%	0.444	0.477	0.033
September 1, 2006	1.992	2.560	29%	1.687	2.528	50%	0.403	0.476	0.073
September 5, 2006	1.962	2.411	23%	2.650	4.520	71%	0.530	0.620	0.090
September 14, 2006	2.049	2.443	19%	1.831	2.555	40%	0.435	0.478	0.043
September 28, 2006	1.742	2.129	22%	1.481	2.738	85%	0.393	0.491	0.098
October 5, 2006	2.211	2.466	12%	1.751	2.198	26%	0.413	0.447	0.034
October 17, 2006	2.048	2.231	9%	1.996	2.54	27%	0.464	0.477	0.013
October 27, 2006	2.789	2.438	-13%	3.955	2.993	-24%	0.611	0.507	-0.104
November 7, 2006	2.569	2.404	-6%	3.199	3.692	15%	0.576	0.563	-0.013
November 16, 2006	2.807	2.659	-5%	12.641	7.819	-38%	1.560	0.826	-0.734
November 22, 2006	2.202	1.962	-11%	1.875	1.691	-10%	0.429	0.395	-0.034
December 22, 2006	2.421	2.137	-12%	3.022	1.954	-35%	0.568	0.421	-0.147
January 1, 2007	2.427	2.093	-14%	3.109	2.862	-8%	0.557	0.499	-0.058
January 7, 2007	2.539	2.082	-18%	2.179	1.682	-23%	0.474	0.394	-0.080
March 1, 2007	2.847	2.149	-25%	3.480	2.125	-39%	0.574	0.439	-0.135
March 15, 2007	3.599	2.588	-28%	3.950	2.623	-34%	0.636	0.483	-0.153
April 4, 2007	1.880	1.844	-2%	1.341	1.280	-5%	0.373	0.359	-0.014
April 11, 2007	2.022	1.974	-2%	2.097	1.742	-17%	0.443	0.400	-0.043
April 14, 2007	3.697	3.039	-18%	4.224	3.63	-14%	0.655	0.557	-0.098


JF37
Simulated vs. Observed Event Volume
y = 0.5687x + 1.0529
R2 = 0.5054
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

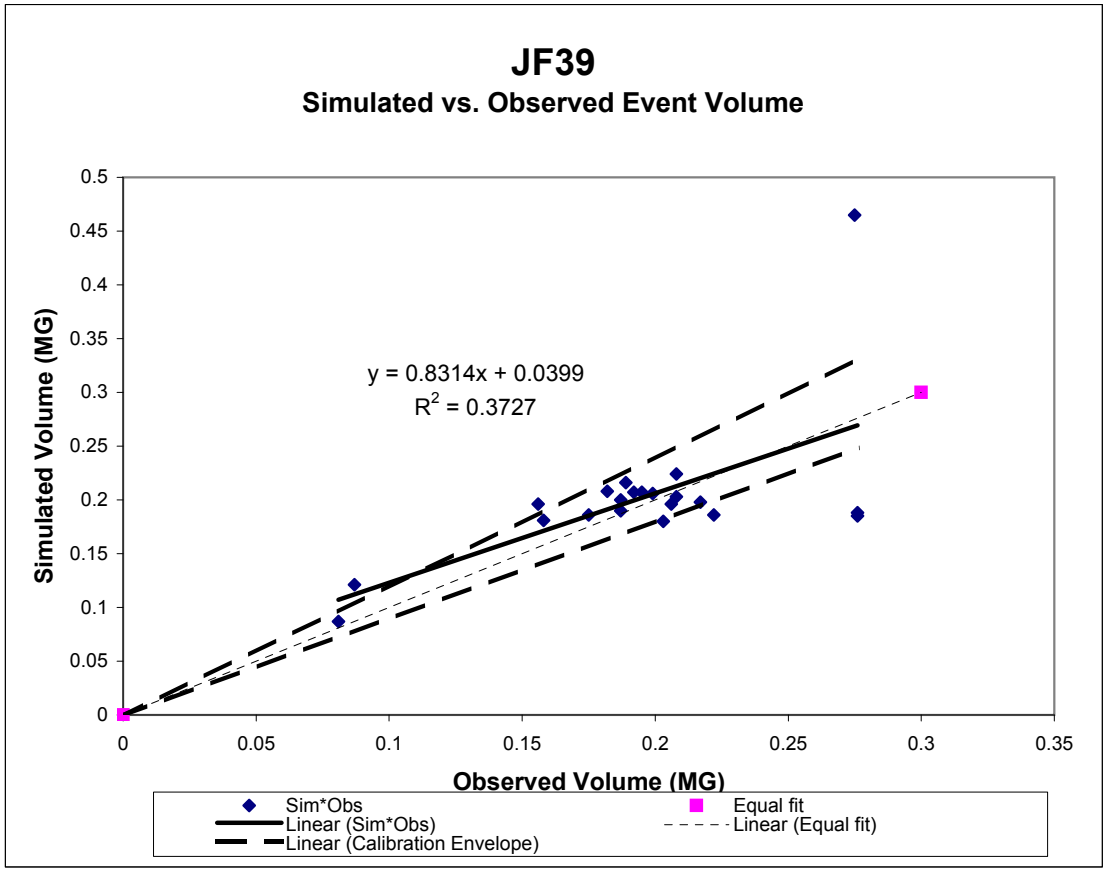

JF37
Simulated vs. Observed Event Peak
y = 0.8742x + 1.1734
R2 = 0.5659
Simulated Peak (mgd)
Observed Peak (mgd)
0
2
4
6
8
10
12
14
16
18
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

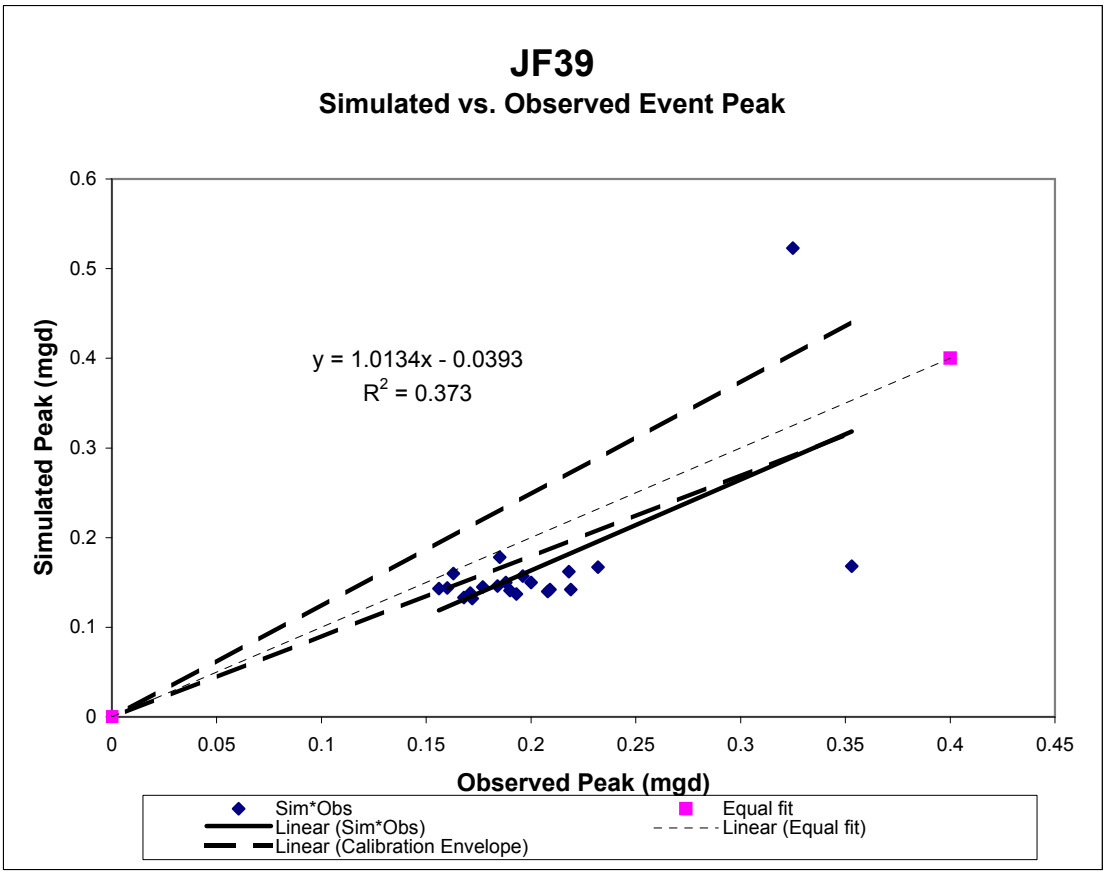
Storm Events	JF38 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.621	1.162	87%	0.829	2.664	221%	0.274	0.362	0.088
June 1, 2006	0.278	0.409	47%	0.475	0.537	13%	0.179	0.183	0.004
June 2, 2006	0.325	0.907	179%	0.74	3.255	340%	0.252	0.415	0.163
June 19, 2006	0.571	0.892	56%	0.533	1.16	118%	0.199	0.246	0.047
June 25, 2006	1.799	2.354	31%	4.865	7.527	55%	1.699	4.887	3.188
July 5, 2006	0.856	1.178	38%	1.393	2.811	102%	0.369	0.372	0.003
July 22, 2006	0.647	1.023	58%	0.768	2.433	217%	0.246	0.349	0.103
August 7, 2006	0.629	0.943	50%	0.46	1.041	126%	0.18	0.233	0.053
September 1, 2006	0.739	1.192	61%	0.605	1.198	98%	0.215	0.249	0.034
September 5, 2006	0.704	1.107	57%	0.813	1.834	126%	0.259	0.299	0.040
September 14, 2006	0.768	1.127	47%	0.599	1.061	77%	0.207	0.235	0.028
September 28, 2006	0.633	0.962	52%	0.530	1.042	97%	0.198	0.233	0.035
October 5, 2006	0.964	1.132	17%	0.747	1.008	35%	0.215	0.230	0.015
October 17, 2006	0.886	1.022	15%	0.825	1.165	41%	0.242	0.246	0.004
October 27, 2006	1.276	1.123	-12%	3.264	1.312	-60%	0.615	0.261	-0.354
November 7, 2006	1.133	1.112	-2%	1.307	1.538	18%	0.327	0.279	-0.048
November 16, 2006	1.455	1.250	-14%	5.281	3.136	-41%	1.242	0.406	-0.836
November 22, 2006	0.939	0.875	-7%	0.696	0.722	4%	0.235	0.204	-0.031
December 22, 2006	0.998	0.968	-3%	1.213	0.88	-27%	0.308	0.218	-0.090
January 1, 2007	0.92	0.946	3%	1.225	1.148	-6%	0.308	0.244	-0.064
January 7, 2007	1.137	0.944	-17%	1.01	0.758	-25%	0.275	0.208	-0.067
March 1, 2007	1.281	0.972	-24%	1.833	0.952	-48%	0.155	0.152	-0.003
March 15, 2007	1.508	1.209	-20%	1.759	1.195	-32%	0.417	0.249	-0.168
April 4, 2007	0.846	0.814	-4%	0.610	0.560	-8%	0.205	0.186	-0.019
April 11, 2007	0.893	0.882	-1%	0.898	0.768	-14%	0.263	0.209	-0.054
April 14, 2007	1.782	1.5	-16%	3.377	1.853	-45%	0.649	0.3	-0.349


JF38
Simulated vs. Observed Event Volume
y = 0.5876x + 0.5214
R2 = 0.498
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

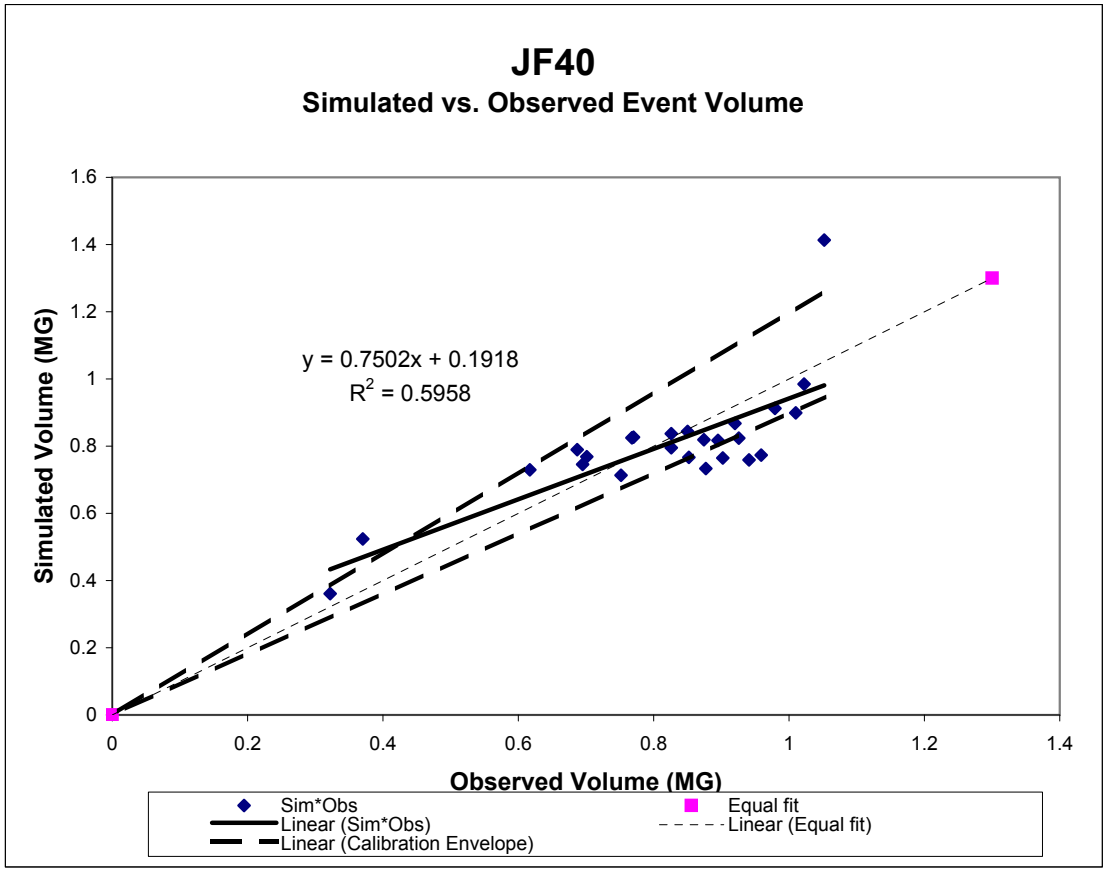

JF38
Simulated vs. Observed Event Peak
y = 0.691x + 0.7012
R2 = 0.4033
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
8
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

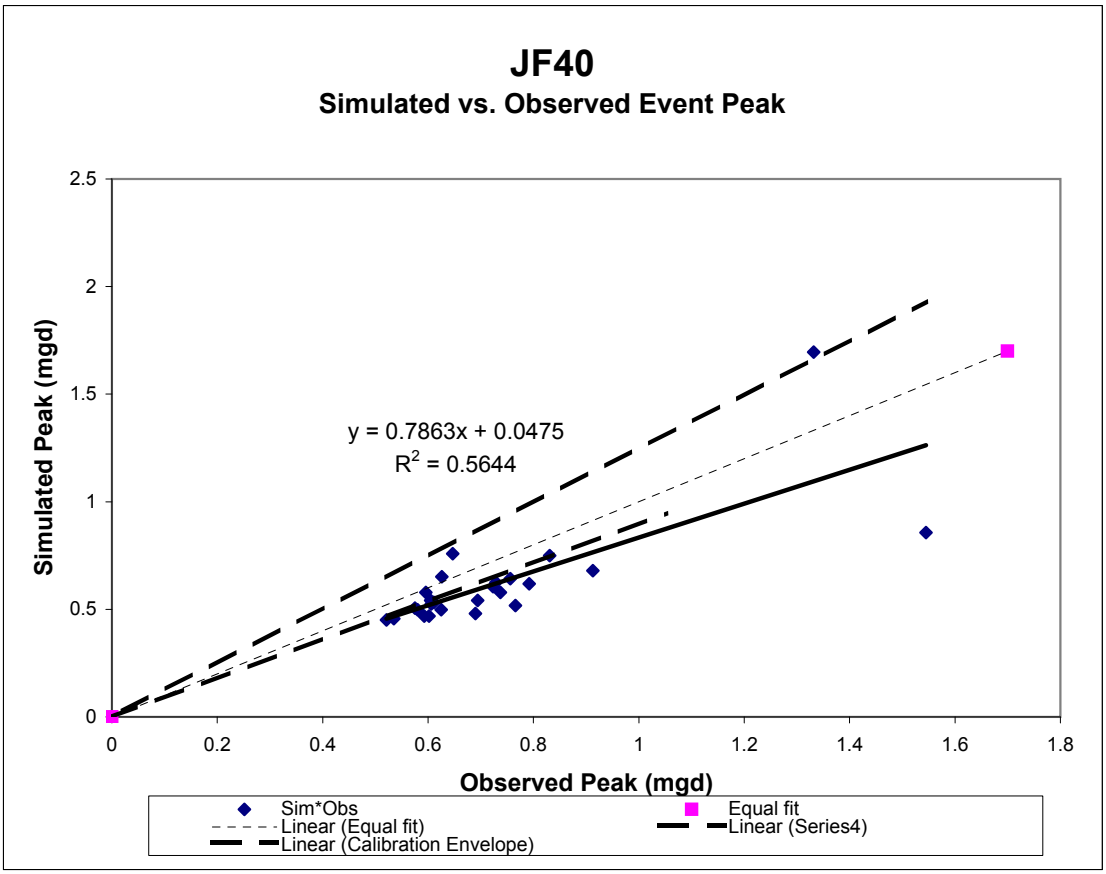
	JF39 12-inch Diameter Pipe								
Storm Events	**Volume (mg) (-10% to+20%)**			**Peak Flow (mgd)(-10%to+25%)**			**Depth (ft.)(-0.25' to+0.5')**		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.192	0.207	8%	0.218	0.162	-26%	0.188	0.194	0.006
June 1, 2006	0.081	0.087	7%	0.168	0.133	-21%	0.163	0.177	0.014
June 2, 2006	0.087	0.121	39%	0.185	0.178	-4%	0.194	0.202	0.008
June 19, 2006	0.158	0.181	15%	0.171	0.138	-19%	0.172	0.18	0.008
June 25, 2006	0.275	0.465	69%	0.325	0.523	61%	0.255	0.337	0.082
July 5, 2006	0.189	0.216	14%	0.232	0.167	-28%	0.192	0.197	0.005
July 22, 2006	0.156	0.196	26%	0.209	0.142	-32%	0.196	0.183	-0.013
August 7, 2006	0.175	0.186	6%	0.219	0.142	-35%	0.201	0.183	-0.018
September 1, 2006	0.195	0.207	6%	0.163	0.160	-2%	0.191	0.193	0.002
September 5, 2006	0.182	0.208	14%	0.188	0.150	-20%	0.188	0.187	-0.001
September 14, 2006	0.187	0.2	7%	0.16	0.144	-10%	0.185	0.184	-0.001
September 28, 2006	0.187	0.190	2%	0.156	0.143	-8%	0.169	0.183	0.014
October 5, 2006	0.208	0.203	-2%	0.177	0.145	-18%	0.183	0.184	0.001
October 17, 2006	0.206	0.196	-5%	0.184	0.146	-21%	0.186	0.185	-0.001
October 27, 2006	0.217	0.198	-9%	0.2	0.15	-25%	0.191	0.187	-0.004
November 7, 2006	0.199	0.206	4%	0.196	0.157	-20%	0.198	0.192	-0.006
November 16, 2006	0.208	0.224	8%	0.353	0.168	-52%	0.277	0.197	-0.080
November 22, 2006	0.203	0.180	-11%	0.193	0.137	-29%	0.193	0.179	-0.014
December 22, 2006	0.222	0.186	-16%	0.172	0.132	-23%	0.179	0.176	-0.003
January 1, 2007	0.276	0.188	-32%	0.19	0.141	-26%	0.181	0.182	0.001
January 7, 2007	0.276	0.185	-33%	0.208	0.14	-33%	0.186	0.181	-0.005
March 1, 2007									
March 15, 2007									
April 4, 2007									
April 11, 2007									
April 14, 2007									


JF39
Simulated vs. Observed Event Volume
y = 0.8314x + 0.0399
R2 = 0.3727
Simulated Volume (MG)
Observed Volume (MG)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

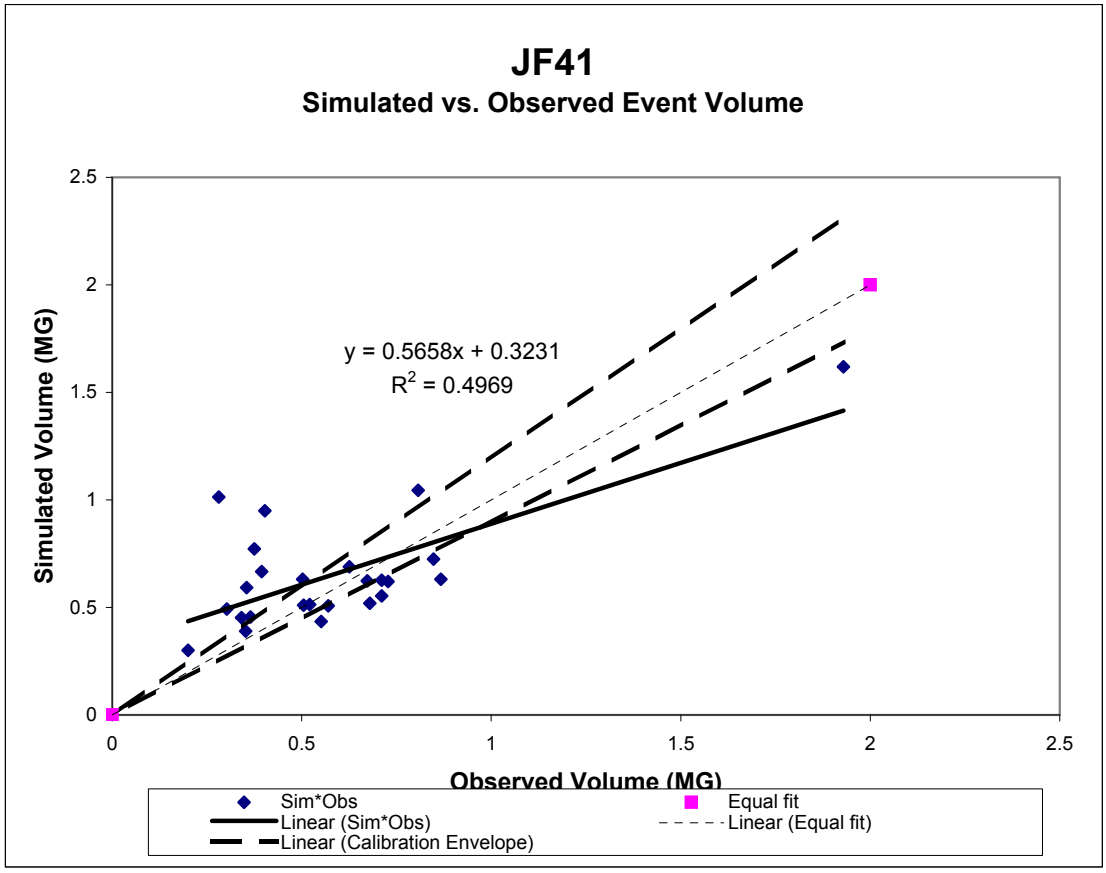

JF39
Simulated vs. Observed Event Peak
y = 1.0134x - 0.0393
R2 = 0.373
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

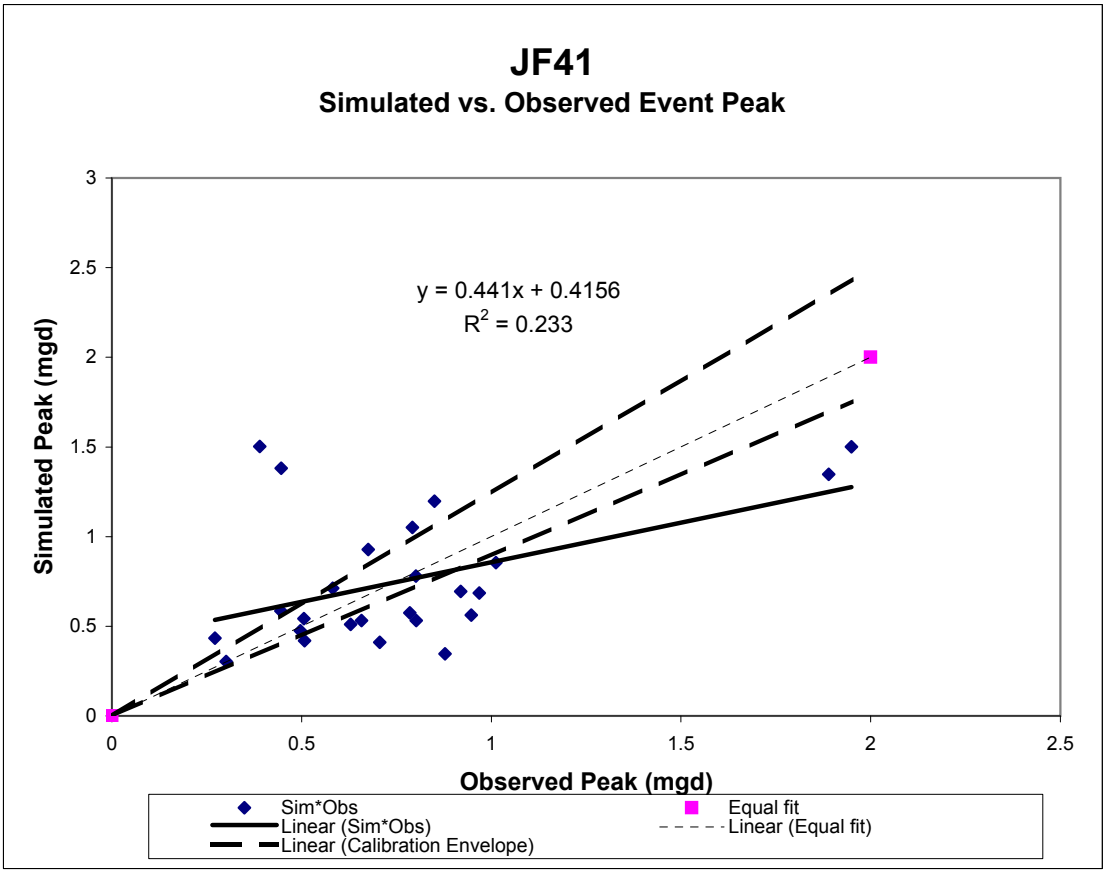
Storm Events	JF40 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.77	0.827	7%	0.792	0.619	-22%	0.379	0.341	-0.038
June 1, 2006	0.322	0.361	12%	0.535	0.457	-15%	0.307	0.291	-0.016
June 2, 2006	0.37	0.524	42%	0.647	0.758	17%	0.342	0.371	0.029
June 19, 2006	0.617	0.73	18%	0.602	0.468	-22%	0.323	0.294	-0.029
June 25, 2006	1.052	1.413	34%	1.332	1.696	27%	0.512	3.296	2.784
July 5, 2006	0.979	0.912	-7%	0.913	0.679	-26%	0.412	0.354	-0.058
July 22, 2006	0.687	0.790	15%	0.596	0.578	-3%	0.325	0.329	0.004
August 7, 2006	0.695	0.746	7%	0.69	0.481	-30%	0.355	0.298	-0.057
September 1, 2006	0.850	0.844	-1%	0.626	0.652	4%	0.331	0.348	0.017
September 5, 2006	0.826	0.837	1%	0.756	0.643	-15%	0.366	0.347	-0.019
September 14, 2006	0.874	0.819	-6%	0.766	0.518	-32%	0.364	0.309	-0.055
September 28, 2006	0.701	0.769	10%	0.580	0.498	-14%	0.325	0.303	-0.022
October 5, 2006	0.768	0.825	7%	0.605	0.541	-11%	0.326	0.317	-0.009
October 17, 2006	0.826	0.795	-4%	0.611	0.532	-13%	0.329	0.314	-0.015
October 27, 2006	0.895	0.817	-9%	0.723	0.605	-16%	0.356	0.337	-0.019
November 7, 2006	0.926	0.824	-11%	0.729	0.624	-14%	0.356	0.342	-0.014
November 16, 2006	1.010	0.899	-11%	1.545	0.857	-45%	0.542	0.399	-0.143
November 22, 2006	0.877	0.733	-16%	0.593	0.468	-21%	0.317	0.294	-0.023
December 22, 2006	0.852	0.767	-10%	0.575	0.505	-12%	0.301	0.305	0.004
January 1, 2007	0.902	0.765	-15%	0.606	0.525	-13%	0.313	0.312	-0.001
January 7, 2007	0.941	0.759	-19%	0.625	0.498	-20%	0.316	0.303	-0.013
March 1, 2007	0.959	0.773	-19%	0.694	0.541	-22%	0.334	0.317	-0.017
March 15, 2007	0.920	0.868	-6%	0.737	0.579	-21%	0.342	0.329	-0.013
April 4, 2007	0.752	0.713	-5%	0.521	0.451	-13%	0.284	0.290	0.006
April 11, 2007									
April 14, 2007	1.022	0.985	-4%	0.831	0.75	-10%	0.377	0.369	-0.008


JF40
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.7502x + 0.1918
R2 = 0.5958
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

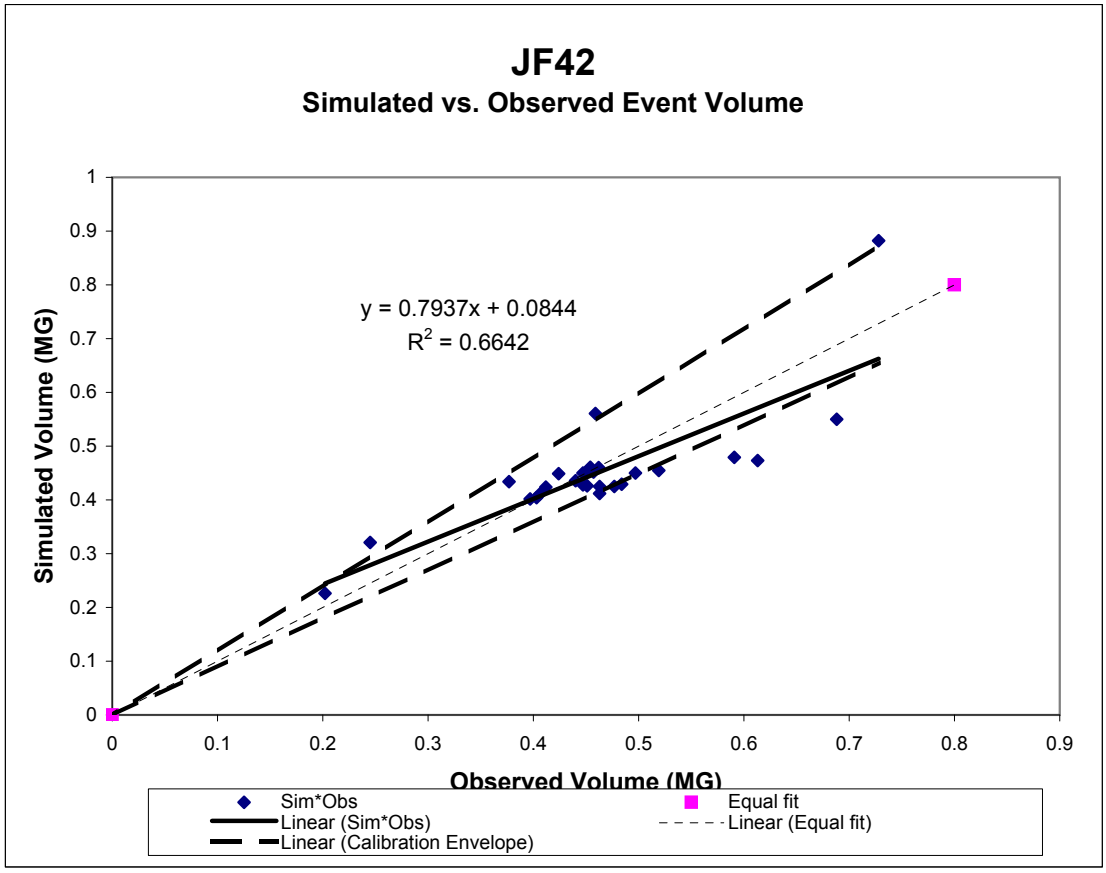

JF40
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.7863x + 0.0475
R2 = 0.5644
0
0.5
1
1.5
2
2.5
0.2
0.4
0.6
0.8
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Equal fit)
Linear (Calibration Envelope)
Equal fit
Linear (Series4)

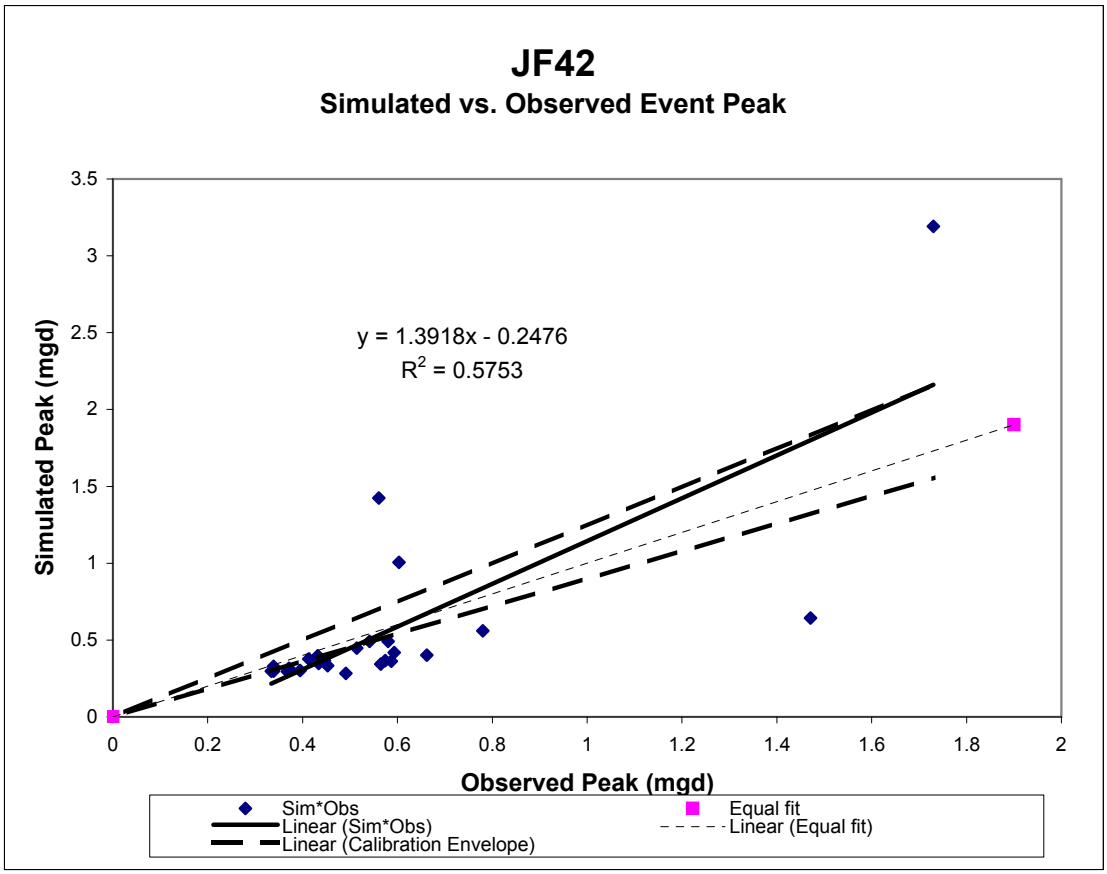
	JF41 8-inch Diameter Pipe								
Storm Events	**Volume (mg) (-10% to+20%)**			**Peak Flow (mgd)(-10%to+25%)**			**Depth (ft.)(-0.25' to+0.5')**		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.394	0.667	69%	0.792	1.051	33%	0.482	6.477	5.995
June 1, 2006	0.200	0.300	50%	0.497	0.474	-5%	0.335	0.343	0.008
June 2, 2006	0.403	0.949	135%	0.446	1.381	210%	0.521	9.471	8.950
June 19, 2006	0.302	0.493	63%	0.802	0.532	-34%	0.483	0.374	-0.109
June 25, 2006	1.929	1.619	-16%	1.949	1.501	-23%	9.542	15.652	6.110
July 5, 2006	0.281	1.014	261%	0.390	1.502	285%	0.262	8.918	8.656
July 22, 2006	0.355	0.593	67%	1.012	0.855	-16%	0.502	2.136	1.634
August 7, 2006	0.365	0.456	25%	0.706	0.410	-42%	0.540	0.321	-0.219
September 1, 2006	0.626	0.689	10%	0.582	0.712	22%	0.411	0.442	0.031
September 5, 2006	0.502	0.631	26%	0.676	0.928	37%	0.372	0.629	0.257
September 14, 2006	0.711	0.626	-12%	0.658	0.531	-19%	0.427	0.373	-0.054
September 28, 2006	0.680	0.519	-24%	0.629	0.510	-19%	0.418	0.364	-0.054
October 5, 2006	0.728	0.621	-15%	0.947	0.563	-41%	4.320	0.383	-3.937
October 17, 2006	0.711	0.554	-22%	0.785	0.575	-27%	3.459	0.384	-3.075
October 27, 2006	0.867	0.631	-27%	0.919	0.694	-24%	6.395	0.437	-5.958
November 7, 2006	0.673	0.624	-7%	0.801	0.780	-3%	4.975	0.483	-4.492
November 16, 2006	0.375	0.773	106%	1.889	1.348	-29%	9.423	9.199	-0.224
November 22, 2006	0.551	0.435	-21%	0.878	0.346	-61%	1.421	0.288	-1.133
December 22, 2006	0.570	0.507	-11%	0.508	0.420	-17%	0.322	0.325	0.003
January 1, 2007	0.505	0.511	1%	0.445	0.586	32%	0.292	0.385	0.093
January 7, 2007									
March 1, 2007	0.521	0.513	-2%	0.506	0.543	7%	0.283	0.377	0.094
March 15, 2007	0.848	0.724	-15%	0.968	0.685	-29%	2.483	0.434	-2.049
April 4, 2007	0.352	0.390	11%	0.301	0.303	1%	0.224	0.262	0.038
April 11, 2007	0.341	0.453	33%	0.272	0.433	59%	0.207	0.329	0.122
April 14, 2007	0.807	1.045	29%	0.850	1.198	41%	7.283	7.079	-0.204


JF41
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5658x + 0.3231
R2 = 0.4969
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

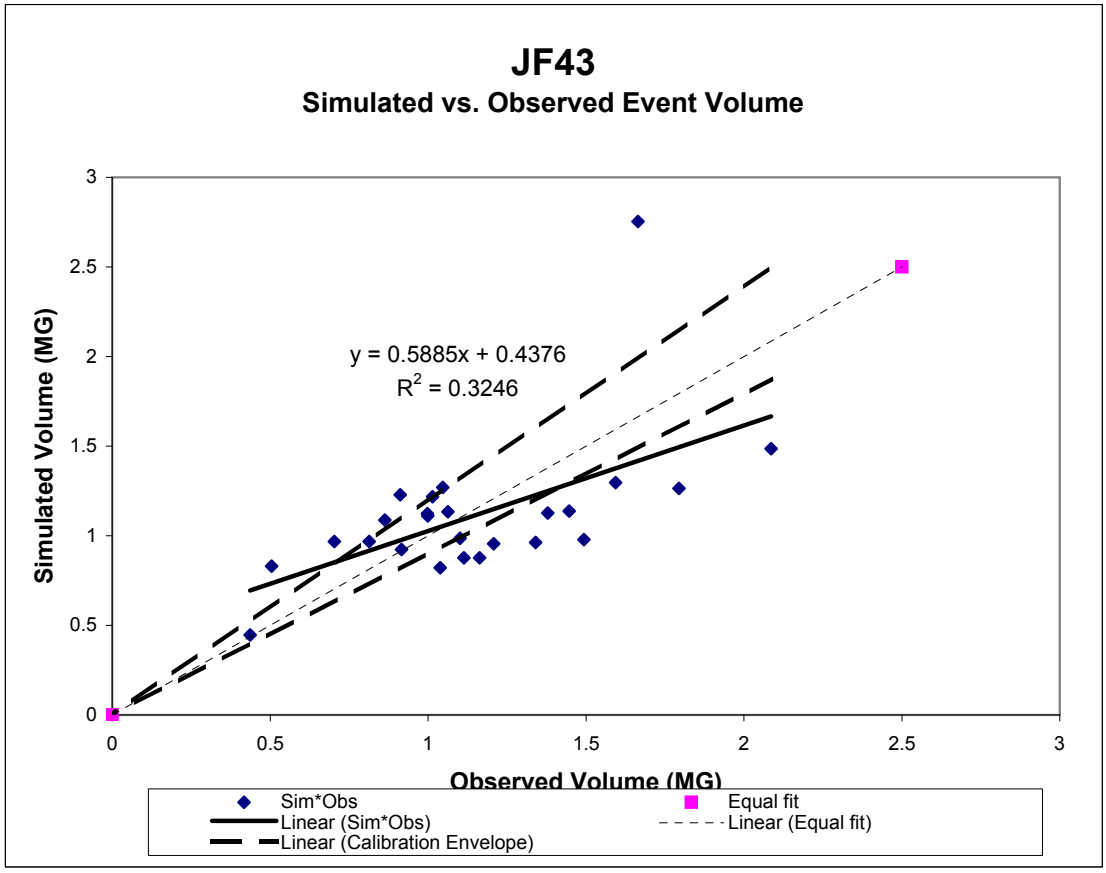

JF41
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.441x + 0.4156
R2 = 0.233
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

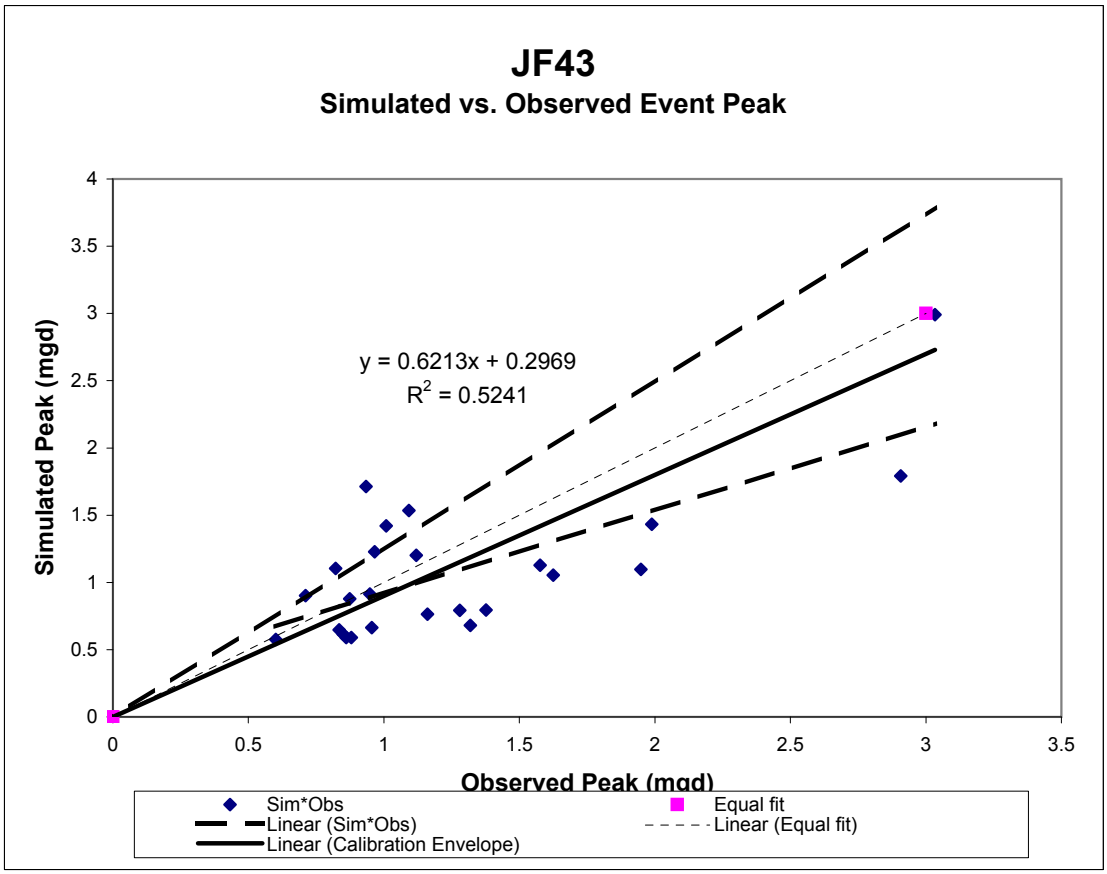
Storm Events	JF42 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.424	0.449	6%	0.58	0.492	-15%	0.806	0.345	-0.461
June 1, 2006	0.202	0.226	12%	0.413	0.376	-9%	0.430	0.302	-0.128
June 2, 2006	0.245	0.321	31%	0.603	1.005	67%	0.949	0.497	-0.452
June 19, 2006	0.451	0.426	-6%	0.662	0.401	-39%	1.02	0.312	-0.708
June 25, 2006	0.728	0.882	21%	1.730	3.192	85%	4.807	1.776	-3.031
July 5, 2006	0.459	0.561	22%	0.561	1.425	154%	0.652	0.599	-0.053
July 22, 2006	0.377	0.434	15%	0.541	0.491	-9%	0.614	0.345	-0.269
August 7, 2006	0.403	0.404	0%	0.339	0.297	-12%	0.337	0.269	-0.068
September 1, 2006	0.454	0.461	2%	0.439	0.374	-15%	0.404	0.301	-0.103
September 5, 2006	0.447	0.450	1%	0.514	0.448	-13%	0.496	0.329	-0.167
September 14, 2006	0.462	0.46	0%	0.434	0.348	-20%	0.397	0.29	-0.107
September 28, 2006	0.412	0.424	3%	0.395	0.302	-24%	0.375	0.270	-0.105
October 5, 2006	0.457	0.452	-1%	0.446	0.367	-18%	0.390	0.298	-0.092
October 17, 2006	0.44	0.436	-1%	0.371	0.316	-15%	0.367	0.277	-0.090
October 27, 2006	0.519	0.455	-12%	0.565	0.344	-39%	0.569	0.289	-0.280
November 7, 2006	0.497	0.45	-9%	0.593	0.419	-29%	0.703	0.318	-0.385
November 16, 2006	0.591	0.479	-19%	1.471	0.643	-56%	6.747	0.395	-6.352
November 22, 2006	0.463	0.412	-11%	0.368	0.295	-20%	0.349	0.268	-0.081
December 22, 2006	0.463	0.425	-8%	0.491	0.283	-42%	1.031	0.262	-0.769
January 1, 2007	0.447	0.428	-4%	0.432	0.397	-8%	1.047	0.31	-0.737
January 7, 2007	0.477	0.425	-11%	0.453	0.333	-26%	1.27	0.284	-0.986
March 1, 2007	0.484	0.429	-11%	0.587	0.362	-38%	1.648	0.296	-1.352
March 15, 2007	0.613	0.473	-23%	0.574	0.366	-36%	0.652	0.298	-0.354
April 4, 2007	0.397	0.402	1%	0.334	0.297	-11%	0.341	0.268	-0.073
April 11, 2007	0.406	0.411	1%	0.339	0.329	-3%	0.344	0.282	-0.062
April 14, 2007	0.688	0.55	-20%	0.78	0.56	-28%	1.016	0.369	-0.647


JF42
Simulated vs. Observed Event Volume
y = 0.7937x + 0.0844
R2 = 0.6642
Simulated Volume (MG)
Observed Volume (MG)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

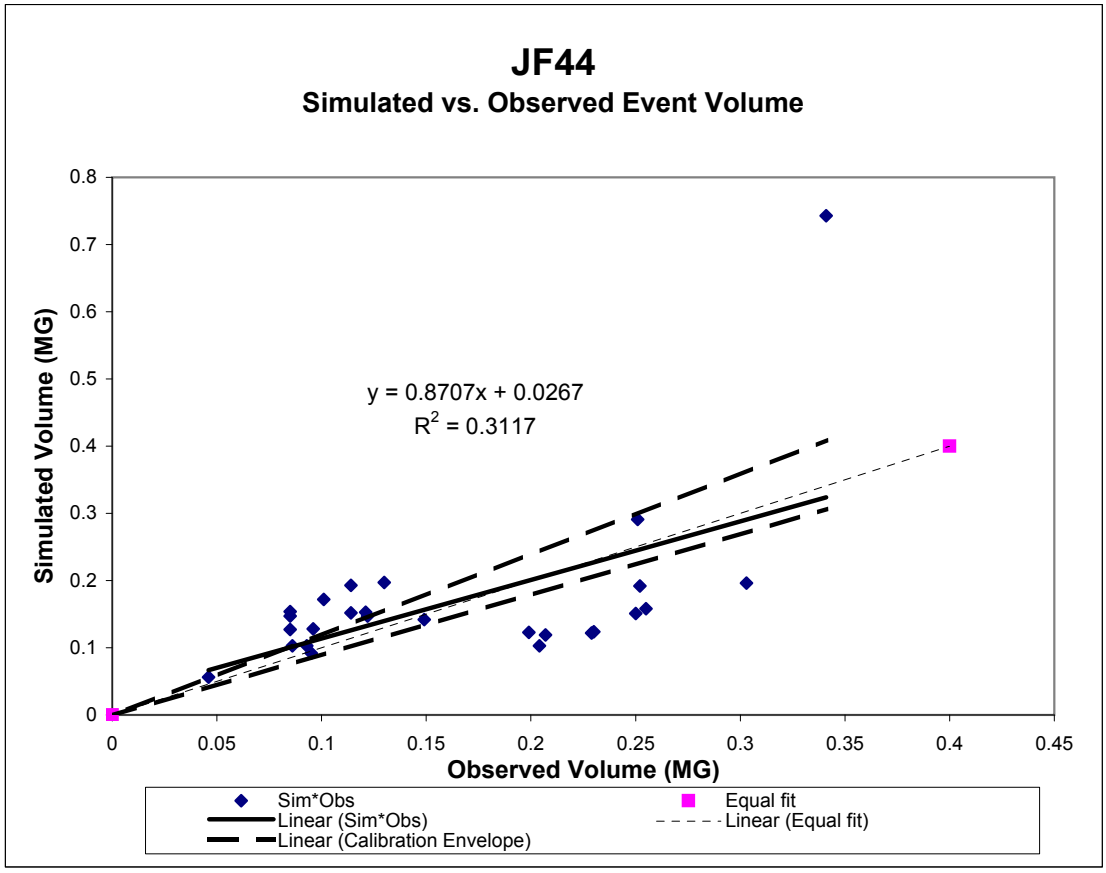

JF42
Simulated vs. Observed Event Peak
y = 1.3918x - 0.2476
R2 = 0.5753
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
0.2
0.4
0.6
0.8
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

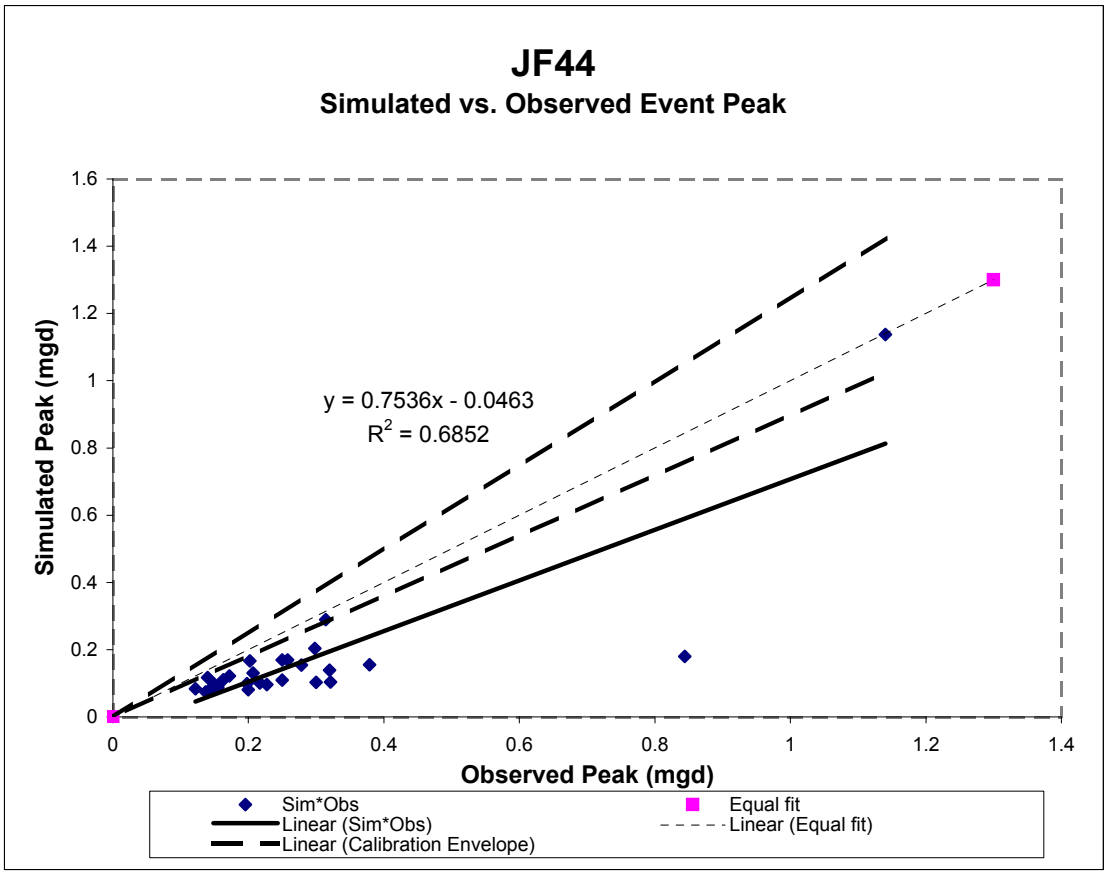
Storm Events	JF43 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.912	1.228	35%	1.008	1.42	41%	0.68	0.69	0.010
June 1, 2006	0.437	0.446	2%	0.601	0.576	-4%	0.519	0.481	-0.038
June 2, 2006	0.505	0.83	64%	0.934	1.714	84%	0.658	0.748	0.090
June 19, 2006	0.703	0.967	38%	0.711	0.901	27%	0.585	0.574	-0.011
June 25, 2006	1.665	2.754	65%	3.033	2.991	-1%	1.381	1.223	-0.158
July 5, 2006	1.047	1.269	21%	1.092	1.535	41%	0.696	0.713	0.017
July 22, 2006	0.863	1.088	26%	0.966	1.228	27%	0.634	0.650	0.016
August 7, 2006	0.916	0.923	1%	0.85	0.614	-28%	0.568	0.49	-0.078
September 1, 2006	1.014	1.217	20%	0.822	1.105	34%	0.583	0.622	0.039
September 5, 2006	0.999	1.111	11%	1.120	1.201	7%	0.702	0.644	-0.058
September 14, 2006	0.998	1.123	13%	0.874	0.878	0%	0.619	0.568	-0.051
September 28, 2006	0.814	0.967	19%	0.835	0.647	-23%	0.571	0.497	-0.074
October 5, 2006	1.063	1.134	7%	0.948	0.913	-4%	0.622	0.577	-0.045
October 17, 2006									
October 27, 2006	1.379	1.127	-18%	1.625	1.053	-35%	0.783	0.61	-0.173
November 7, 2006	1.447	1.138	-21%	1.576	1.128	-28%	0.734	0.627	-0.107
November 16, 2006	1.594	1.297	-19%	2.907	1.791	-38%	1.075	0.763	-0.312
November 22, 2006	1.163	0.876	-25%	0.880	0.591	-33%	0.600	0.485	-0.115
December 22, 2006	1.101	0.985	-11%	1.319	0.681	-48%	0.735	0.505	-0.230
January 1, 2007	1.208	0.956	-21%	1.28	0.793	-38%	0.745	0.524	-0.221
January 7, 2007	1.34	0.963	-28%	1.161	0.765	-34%	0.697	0.52	-0.177
March 1, 2007	1.493	0.979	-34%	1.377	0.794	-42%	0.767	0.524	-0.243
March 15, 2007	1.794	1.264	-30%	1.948	1.097	-44%	0.926	0.620	-0.306
April 4, 2007	1.038	0.821	-21%	0.861	0.589	-32%	0.585	0.484	-0.101
April 11, 2007	1.113	0.877	-21%	0.955	0.664	-30%	0.629	0.501	-0.128
April 14, 2007	2.086	1.485	-29%	1.988	1.432	-28%	0.917	0.693	-0.224


JF43
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5885x + 0.4376
R2 = 0.3246
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

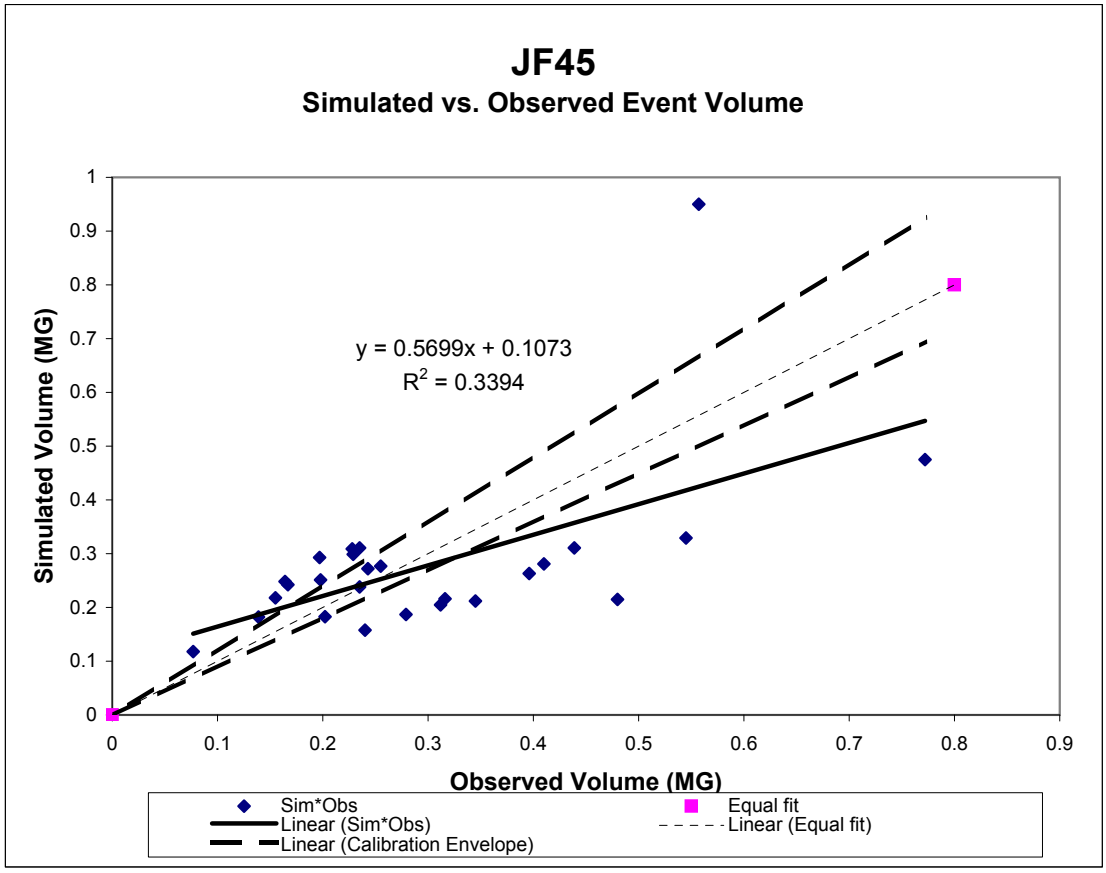

JF43
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.6213x + 0.2969
R2 = 0.5241
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

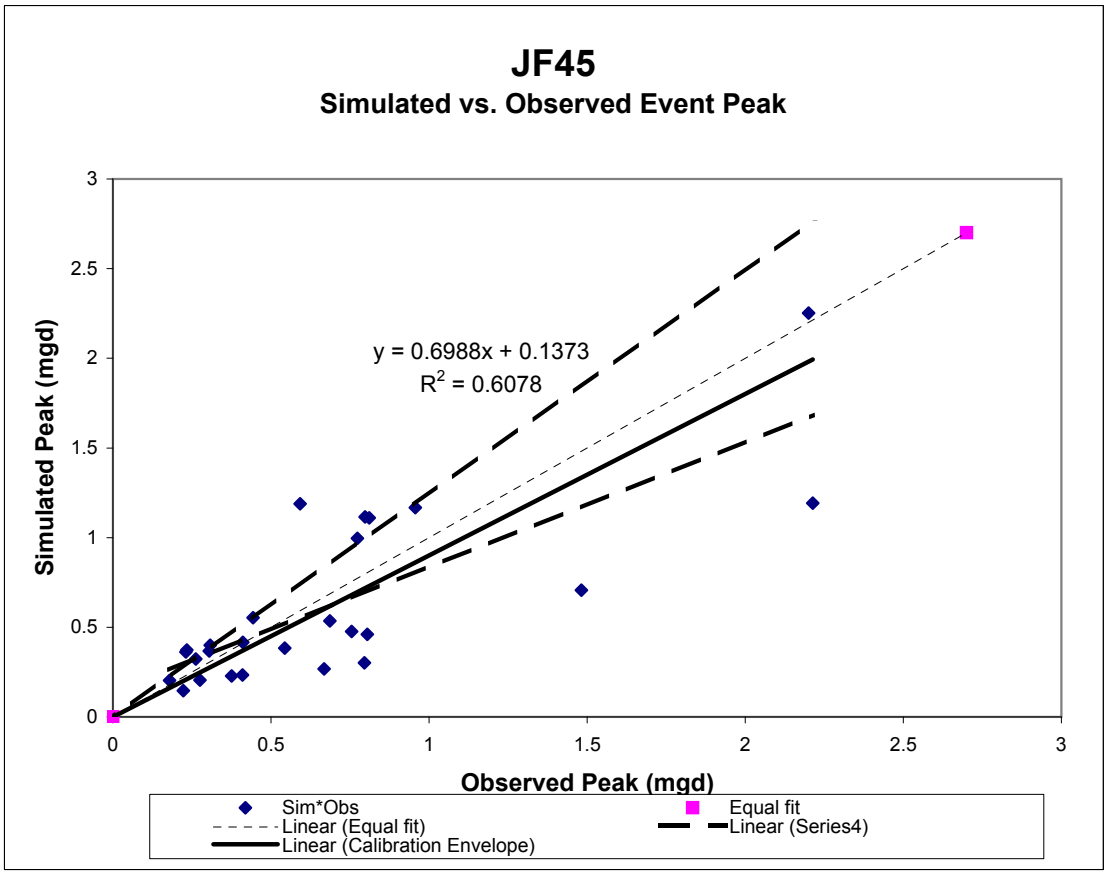
	JF44 8-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.114	0.193	69%	0.25	0.169	-32%	0.184	0.184	0.000
June 1, 2006	0.046	0.056	22%	0.122	0.084	-31%	0.131	0.138	0.007
June 2, 2006	0.085	0.127	49%	0.298	0.204	-32%	0.205	0.198	-0.007
June 19, 2006	0.085	0.147	73%	0.25	0.109	-56%	0.186	0.151	-0.035
June 25, 2006	0.341	0.743	118%	1.140	1.137	0%	0.868	0.600	-0.268
July 5, 2006	0.130	0.197	52%	0.258	0.169	-34%	0.190	0.184	-0.006
July 22, 2006	0.085	0.154	81%	0.140	0.117	-16%	0.139	0.156	0.017
August 7, 2006	0.086	0.103	20%	0.143	0.081	-43%	0.138	0.136	-0.002
September 1, 2006	0.101	0.172	70%	0.202	0.167	-17%	0.194	0.184	-0.010
September 5, 2006	0.114	0.152	33%	0.207	0.130	-37%	0.172	0.164	-0.008
September 14, 2006	0.122	0.147	20%	0.163	0.11	-33%	0.148	0.151	0.003
September 28, 2006	0.096	0.128	33%	0.149	0.099	-34%	0.142	0.145	0.003
October 5, 2006	0.121	0.153	26%	0.172	0.122	-29%	0.150	0.159	0.009
October 17, 2006	0.149	0.142	-5%	0.217	0.101	-53%	0.172	0.147	-0.025
October 27, 2006	0.25	0.151	-40%	0.278	0.154	-45%	0.402	0.178	-0.224
November 7, 2006	0.255	0.158	-38%	0.32	0.139	-57%	0.337	0.17	-0.167
November 16, 2006	0.303	0.196	-35%	0.844	0.180	-79%	0.428	0.189	-0.239
November 22, 2006	0.204	0.103	-50%	0.200	0.081	-60%	0.216	0.137	-0.079
December 22, 2006	0.23	0.124	-46%	0.321	0.104	-68%	0.315	0.148	-0.167
January 1, 2007	0.207	0.119	-43%	0.227	0.096	-58%	0.221	0.144	-0.077
January 7, 2007	0.229	0.122	-47%	0.198	0.099	-50%	0.211	0.145	-0.066
March 1, 2007	0.199	0.123	-38%	0.300	0.103	-66%	0.191	0.148	-0.043
March 15, 2007	0.252	0.192	-24%	0.379	0.155	-59%	0.222	0.178	-0.044
April 4, 2007	0.095	0.092	-3%	0.137	0.074	-46%	0.191	0.132	-0.059
April 11, 2007	0.093	0.103	11%	0.155	0.088	-43%	0.163	0.140	-0.023
April 14, 2007	0.251	0.291	16%	0.314	0.289	-8%	0.199	0.237	0.038


JF44
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.8707x + 0.0267
R2 = 0.3117
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

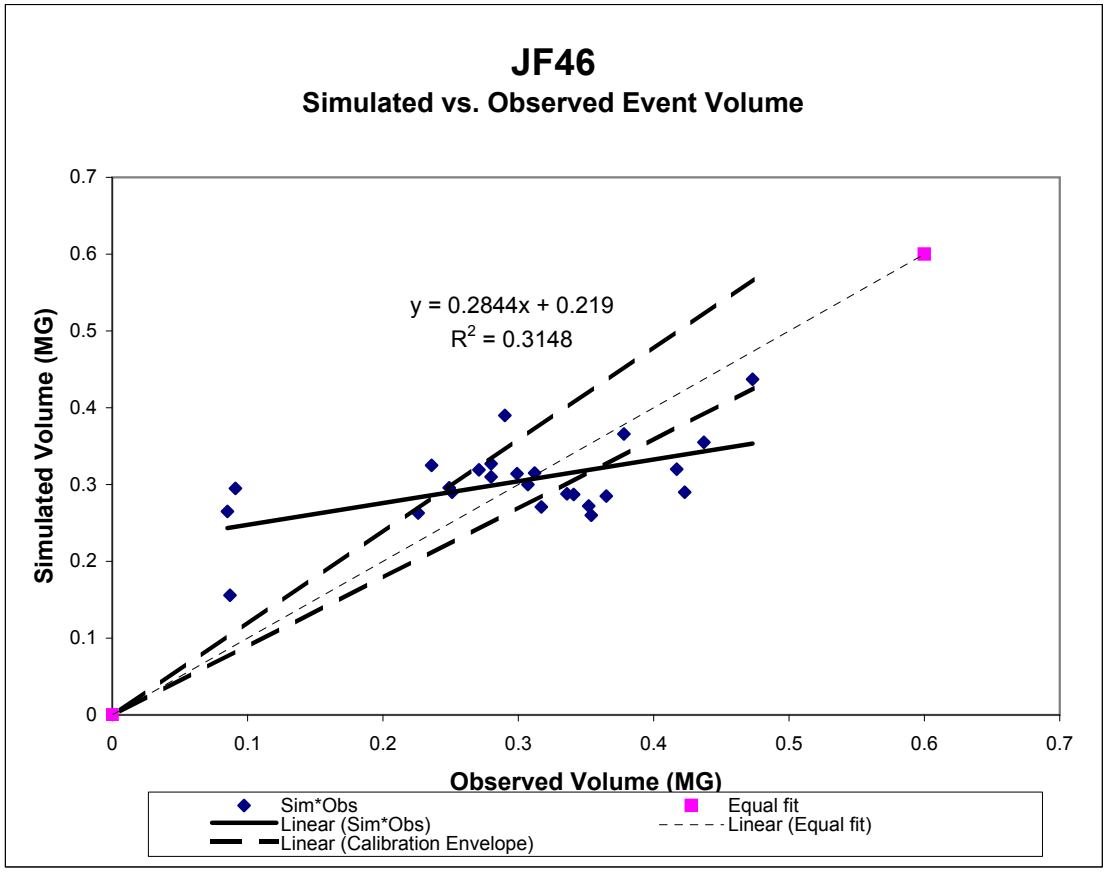

JF44
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.7536x - 0.0463
R2 = 0.6852
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

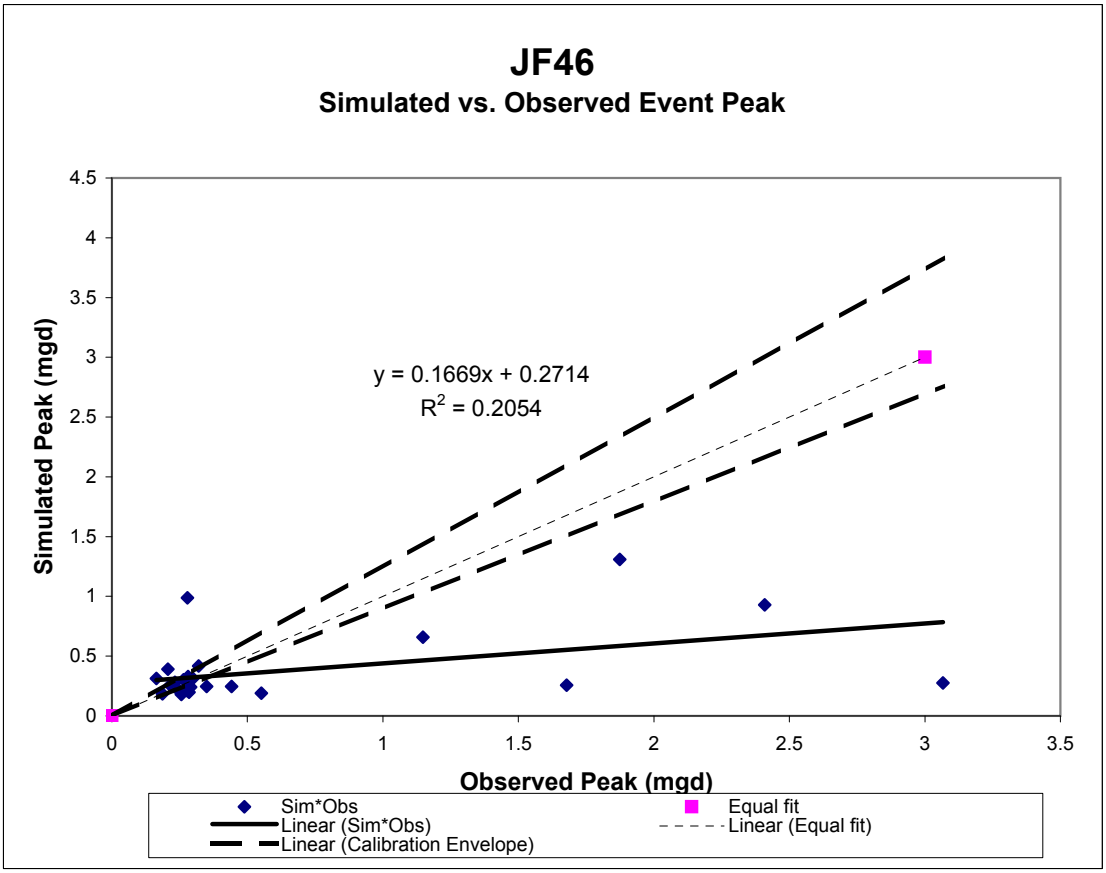
	JF45 10-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.228	0.309	36%	0.592	1.189	101%	0.648	0.459	-0.189
June 1, 2006	0.077	0.118	53%	0.234	0.373	59%	0.300	0.266	-0.034
June 2, 2006	0.197	0.293	49%	0.956	1.167	22%	1.194	0.453	-0.741
June 19, 2006	0.167	0.242	45%	0.773	0.995	29%	0.62	0.421	-0.199
June 25, 2006	0.557	0.950	71%	2.200	2.252	2%	3.194	3.088	-0.106
July 5, 2006	0.235	0.311	32%	0.811	1.110	37%	0.646	0.441	-0.205
July 22, 2006	0.164	0.248	51%	0.798	1.116	40%	0.723	0.442	-0.281
August 7, 2006	0.139	0.182	31%	0.179	0.204	14%	0.236	0.212	-0.024
September 1, 2006	0.229	0.299	31%	0.305	0.368	21%	0.303	0.265	-0.038
September 5, 2006	0.198	0.251	27%	0.443	0.554	25%	0.366	0.316	-0.050
September 14, 2006	0.255	0.277	9%	0.308	0.399	30%	0.318	0.272	-0.046
September 28, 2006	0.155	0.218	41%	0.231	0.362	57%	0.281	0.263	-0.018
October 5, 2006	0.243	0.272	12%	0.262	0.323	23%	0.307	0.235	-0.072
October 17, 2006	0.235	0.238	1%	0.411	0.416	1%	0.377	0.276	-0.101
October 27, 2006	0.41	0.281	-31%	0.755	0.477	-37%	0.901	0.295	-0.606
November 7, 2006	0.396	0.263	-34%	0.686	0.535	-22%	0.627	0.312	-0.315
November 16, 2006	0.439	0.311	-29%	2.214	1.193	-46%	3.384	0.460	-2.924
November 22, 2006	0.202	0.183	-9%	0.275	0.205	-25%	0.345	0.212	-0.133
December 22, 2006	0.316	0.216	-32%	0.668	0.268	-60%	0.582	0.233	-0.349
January 1, 2007	0.312	0.205	-34%	0.544	0.383	-30%	0.427	0.268	-0.159
January 7, 2007	0.345	0.212	-39%	0.375	0.228	-39%	0.363	0.219	-0.144
March 1, 2007	0.480	0.215	-55%	0.796	0.301	-62%	1.011	0.246	-0.765
March 15, 2007	0.545	0.329	-40%	0.805	0.460	-43%	1.092	0.289	-0.803
April 4, 2007	0.240	0.158	-34%	0.223	0.146	-35%	0.234	0.192	-0.042
April 11, 2007	0.279	0.187	-33%	0.410	0.234	-43%	0.326	0.221	-0.105
April 14, 2007	0.772	0.475	-38%	1.482	0.707	-52%	1.657	0.353	-1.304


JF45
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5699x + 0.1073
R2 = 0.3394
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

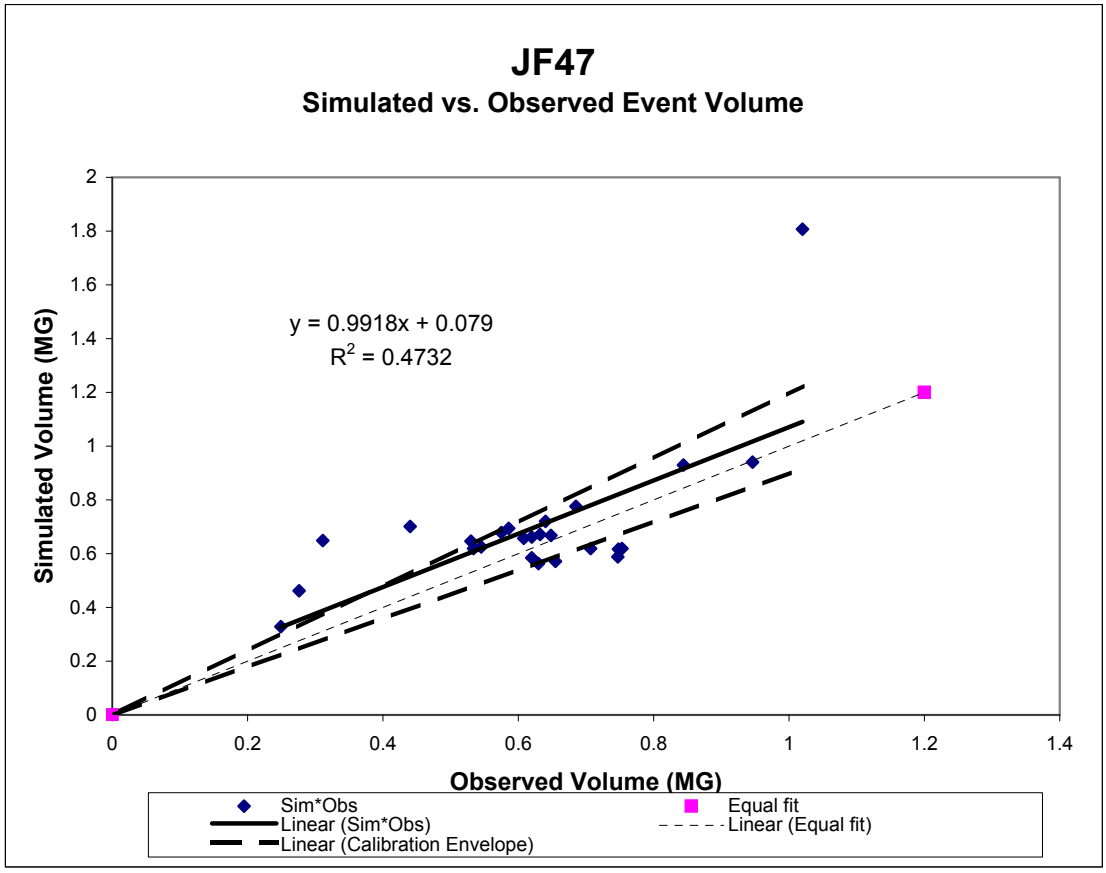

JF45
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.6988x + 0.1373
R2 = 0.6078
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Equal fit
Linear (Equal fit)
Linear (Series4)
Linear (Calibration Envelope)

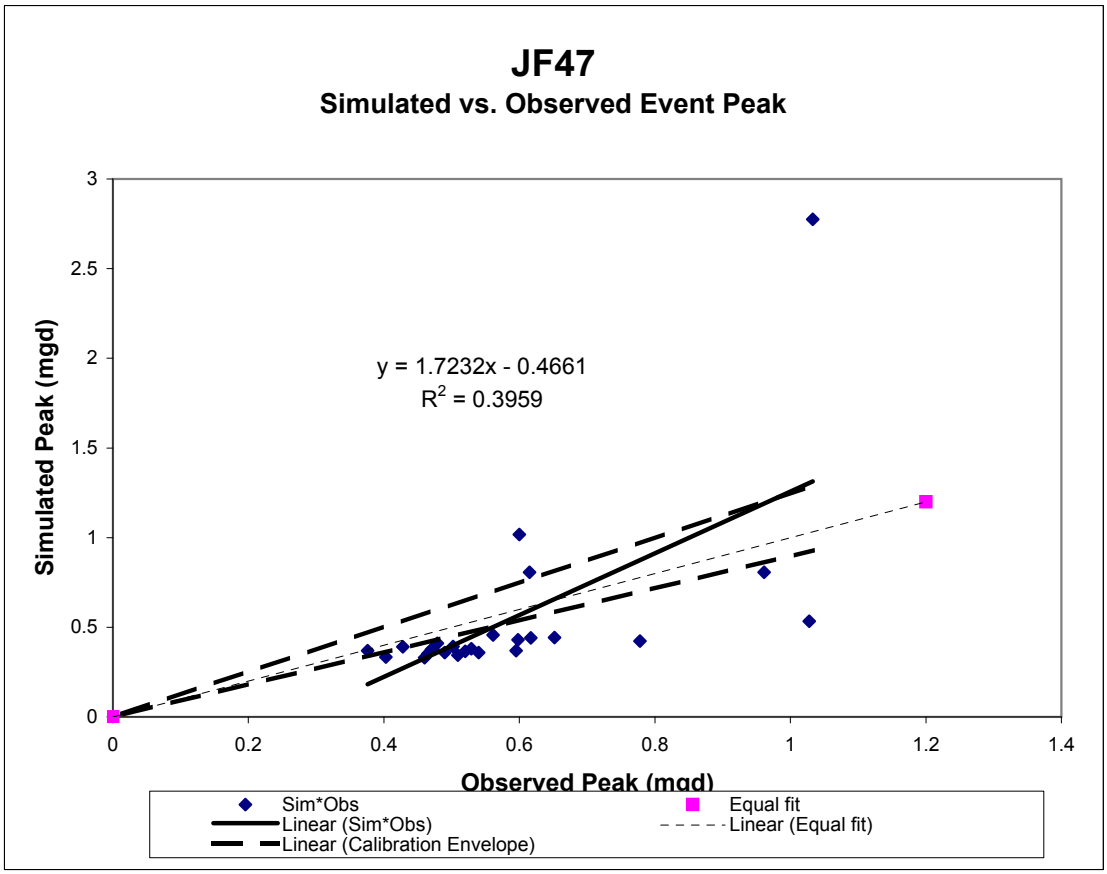
	JF46 12-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.236	0.325	38%	0.207	0.392	89%	0.131	0.163	0.032
June 1, 2006	0.087	0.156	79%	1.678	0.257	-85%	0.641	0.152	-0.489
June 2, 2006	0.085	0.265	212%	1.874	1.309	-30%	0.652	0.424	-0.228
June 19, 2006	0.091	0.295	224%	0.164	0.313	91%	0.12	0.157	0.037
June 25, 2006									
July 5, 2006	0.290	0.390	34%	0.279	0.988	254%	0.155	0.320	0.165
July 22, 2006	0.249	0.296	19%	0.281	0.330	17%	0.166	0.157	-0.009
August 7, 2006	0.226	0.263	16%	0.187	0.186	-1%	0.128	0.141	0.013
September 1, 2006	0.280	0.327	17%	0.233	0.280	20%	0.149	0.156	0.007
September 5, 2006	0.280	0.310	11%	0.264	0.302	14%	0.167	0.157	-0.010
September 14, 2006	0.271	0.319	18%	0.231	0.244	6%	0.147	0.15	0.003
September 28, 2006	0.251	0.290	16%	0.240	0.233	-3%	0.150	0.148	-0.002
October 5, 2006	0.312	0.315	1%	0.291	0.242	-17%	0.168	0.150	-0.018
October 17, 2006	0.307	0.3	-2%	0.442	0.246	-44%	1.996	0.15	-1.846
October 27, 2006	0.417	0.32	-23%	3.067	0.277	-91%	8.799	0.156	-8.643
November 7, 2006	0.299	0.314	5%	0.299	0.314	5%	8.905	0.161	-8.744
November 16, 2006	0.378	0.366	-3%	2.409	0.930	-61%	9.155	0.306	-8.849
November 22, 2006	0.317	0.271	-15%	0.551	0.191	-65%	0.951	0.142	-0.809
December 22, 2006	0.336	0.288	-14%	0.284	0.197	-31%	0.165	0.143	-0.022
January 1, 2007	0.341	0.287	-16%	0.215	0.258	20%	0.143	0.152	0.009
January 7, 2007	0.365	0.285	-22%	0.277	0.212	-23%	0.158	0.145	-0.013
March 1, 2007	0.423	0.290	-31%	0.350	0.245	-30%	0.177	0.150	-0.027
March 15, 2007	0.437	0.355	-19%	0.320	0.417	30%	0.168	0.169	0.001
April 4, 2007	0.354	0.260	-27%	0.256	0.180	-30%	0.151	0.140	-0.011
April 11, 2007	0.352	0.272	-23%	0.274	0.224	-18%	0.153	0.147	-0.006
April 14, 2007	0.473	0.437	-8%	1.148	0.659	-43%	4.924	0.234	-4.690


JF46
Simulated vs. Observed Event Volume
y = 0.2844x + 0.219
R2 = 0.3148
Simulated Volume (MG)
Observed Volume (MG)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

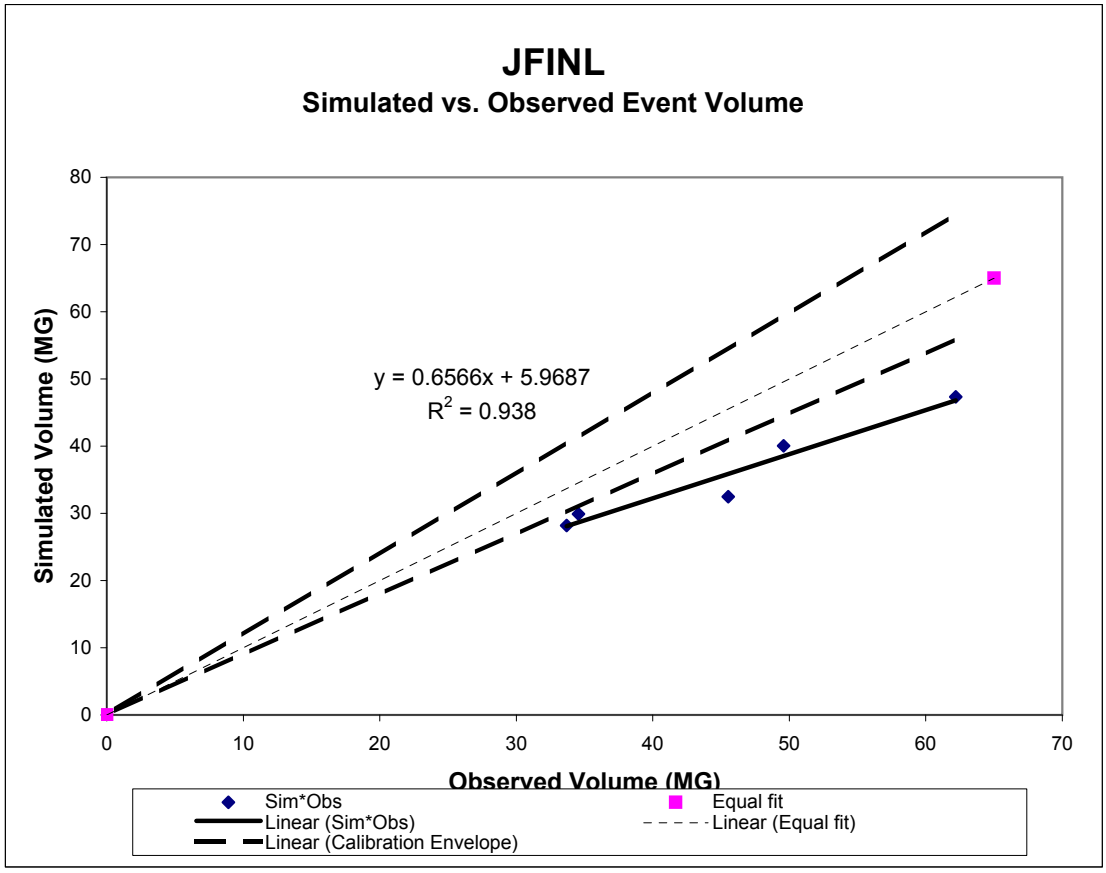

JF46
Simulated vs. Observed Event Peak
y = 0.1669x + 0.2714
R2 = 0.2054
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

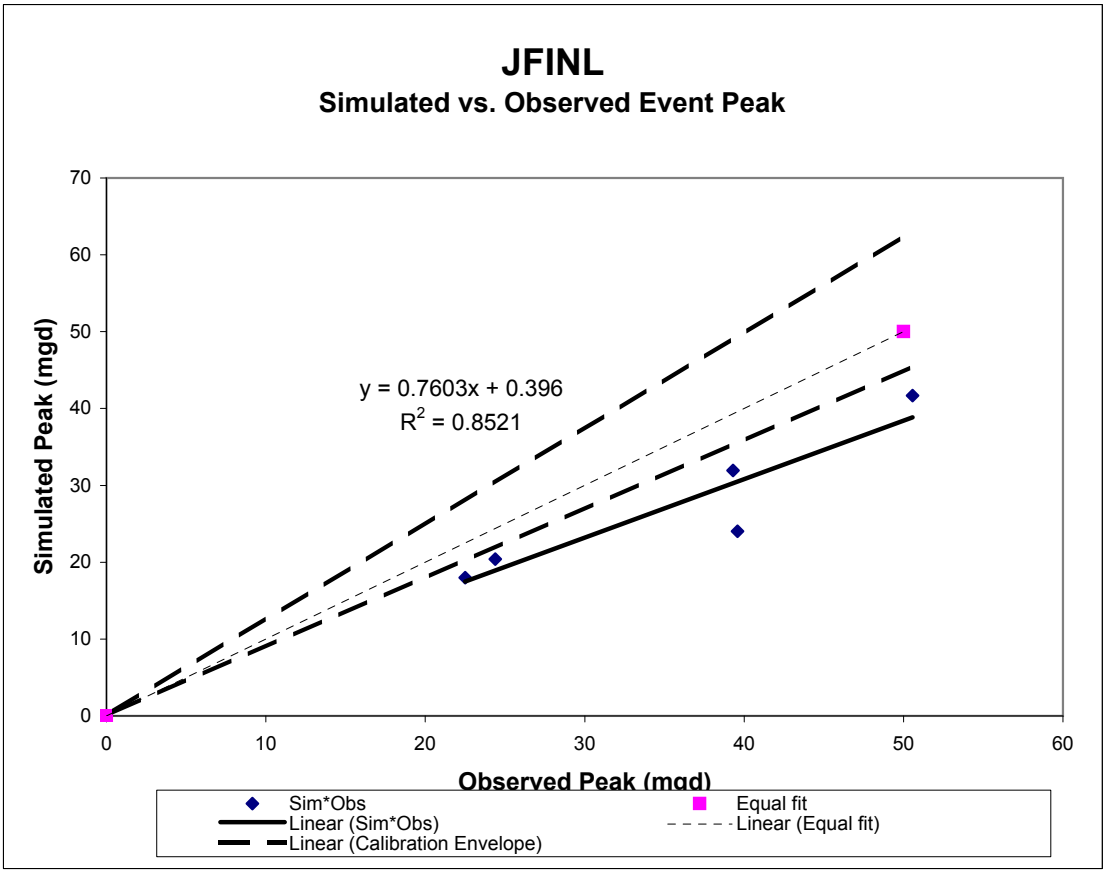
Storm Events	JF47 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.44	0.701	59%	0.617	0.441	-29%	0.524	0.506	-0.018
June 1, 2006	0.249	0.328	32%	0.529	0.380	-28%	0.506	0.472	-0.034
June 2, 2006	0.276	0.462	67%	0.615	0.807	31%	0.728	0.681	-0.047
June 19, 2006	0.311	0.649	109%	0.472	0.381	-19%	0.501	0.473	-0.028
June 25, 2006	1.020	1.807	77%	1.033	2.775	169%	11.475	10.991	-0.484
July 5, 2006	0.844	0.930	10%	0.600	1.017	70%	0.530	0.776	0.246
July 22, 2006									
August 7, 2006	0.63	0.563	-11%	0.403	0.334	-17%	0.448	0.452	0.004
September 1, 2006	0.586	0.694	18%	0.561	0.456	-19%	0.494	0.514	0.020
September 5, 2006	0.632	0.671	6%	0.502	0.392	-22%	0.482	0.479	-0.003
September 14, 2006	0.648	0.668	3%	0.479	0.411	-14%	0.486	0.489	0.003
September 28, 2006	0.545	0.625	15%	0.376	0.370	-2%	0.413	0.468	0.055
October 5, 2006	0.620	0.662	7%	0.428	0.391	-9%	0.437	0.478	0.041
October 17, 2006	0.53	0.647	22%	0.47	0.375	-20%	2.644	0.47	-2.174
October 27, 2006	0.608	0.657	8%	0.598	0.43	-28%	10.347	0.5	-9.847
November 7, 2006	0.575	0.678	18%	0.778	0.423	-46%	10.5	0.496	-10.004
November 16, 2006	0.685	0.776	13%	1.028	0.533	-48%	10.874	0.546	-10.328
November 22, 2006	0.747	0.588	-21%	0.509	0.344	-32%	1.656	0.456	-1.200
December 22, 2006	0.707	0.619	-12%	0.49	0.359	-27%	0.459	0.463	0.004
January 1, 2007	0.753	0.619	-18%	0.52	0.365	-30%	0.458	0.465	0.007
January 7, 2007	0.748	0.617	-18%	0.54	0.359	-34%	0.464	0.463	-0.001
March 1, 2007	0.534	0.619	16%	0.595	0.370	-38%	0.518	0.468	-0.050
March 15, 2007	0.640	0.720	13%	0.652	0.443	-32%	0.567	0.507	-0.060
April 4, 2007	0.655	0.572	-13%	0.460	0.330	-28%	0.467	0.450	-0.017
April 11, 2007	0.620	0.585	-6%	0.465	0.352	-24%	0.456	0.460	0.004
April 14, 2007	0.946	0.94	-1%	0.961	0.807	-16%	6.548	0.68	-5.868


JF47
Simulated vs. Observed Event Volume
y = 0.9918x + 0.079
R2 = 0.4732
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

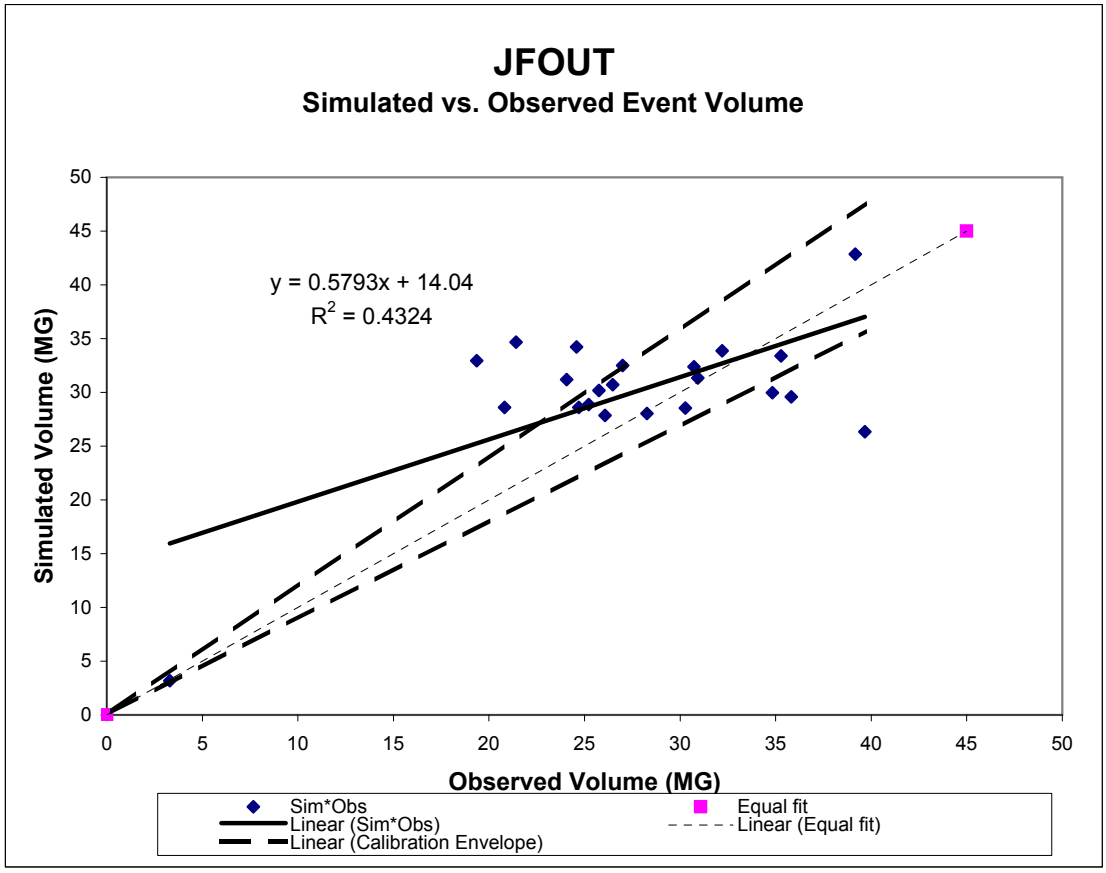

JF47
Simulated vs. Observed Event Peak
y = 1.7232x - 0.4661
R2 = 0.3959
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
0.2
0.4
0.6
0.8
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

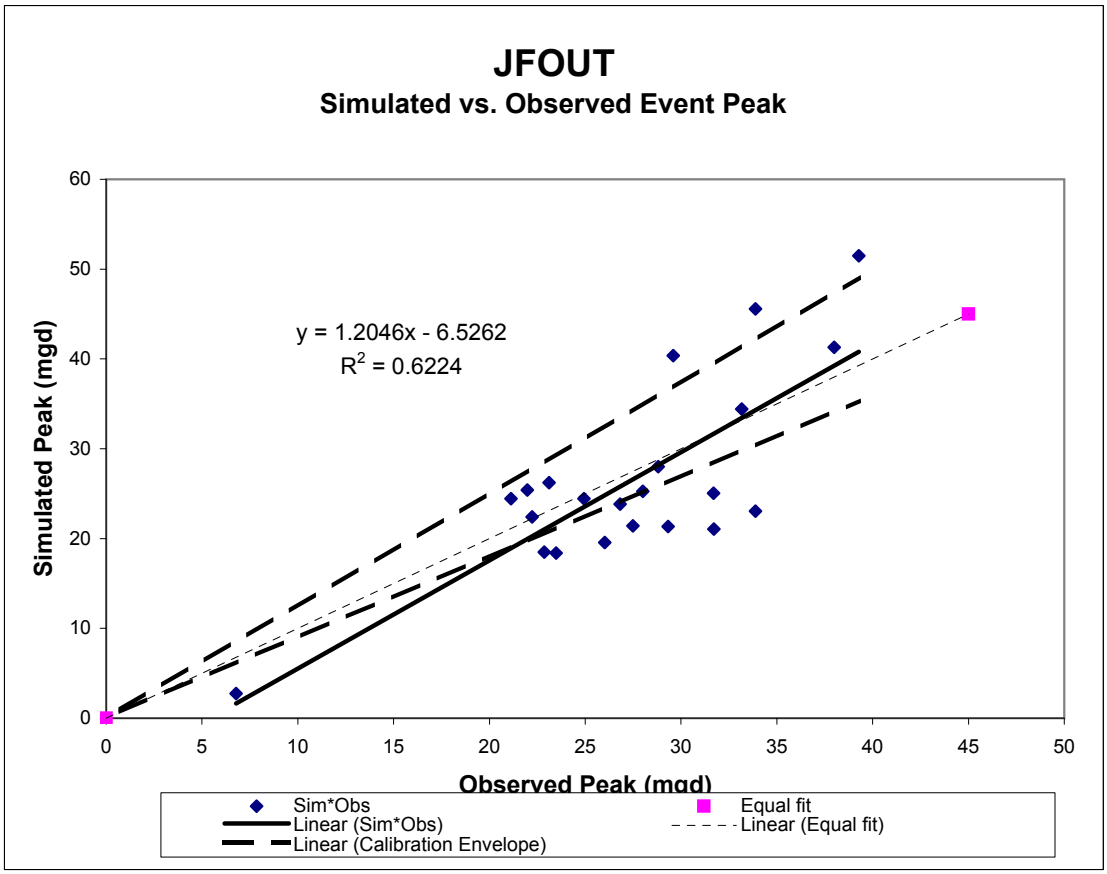
Storm Events	JFINL 48-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006									
June 1, 2006									
June 2, 2006									
June 19, 2006									
June 25, 2006									
July 5, 2006									
July 22, 2006									
August 7, 2006									
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007	45.525	32.457	-29%	39.579	24.013	-39%	5.568	2.934	-2.634
March 15, 2007	49.583	40.058	-19%	39.309	31.954	-19%	8.349	4.137	-4.212
April 4, 2007	33.697	28.195	-16%	22.510	17.996	-20%	2.832	2.378	-0.454
April 11, 2007	34.549	29.903	-13%	24.380	20.406	-16%	2.964	2.593	-0.371
April 14, 2007	62.19	47.324	-24%	50.559	41.673	-18%	12.066	6.864	-5.202


JFINL
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.6566x + 5.9687
R2 = 0.938
0
10
20
30
40
50
60
70
80
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

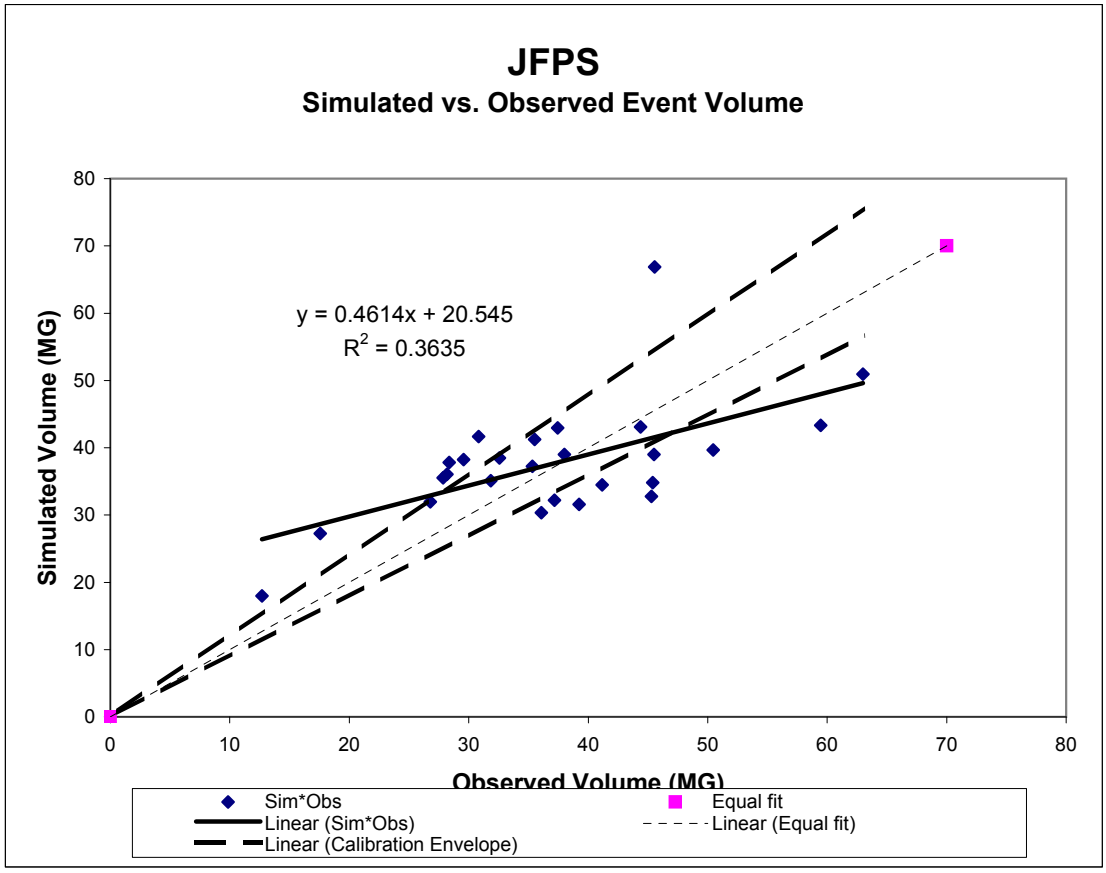

JFINL
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.7603x + 0.396
R2 = 0.8521
0
10
20
30
40
50
60
70
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

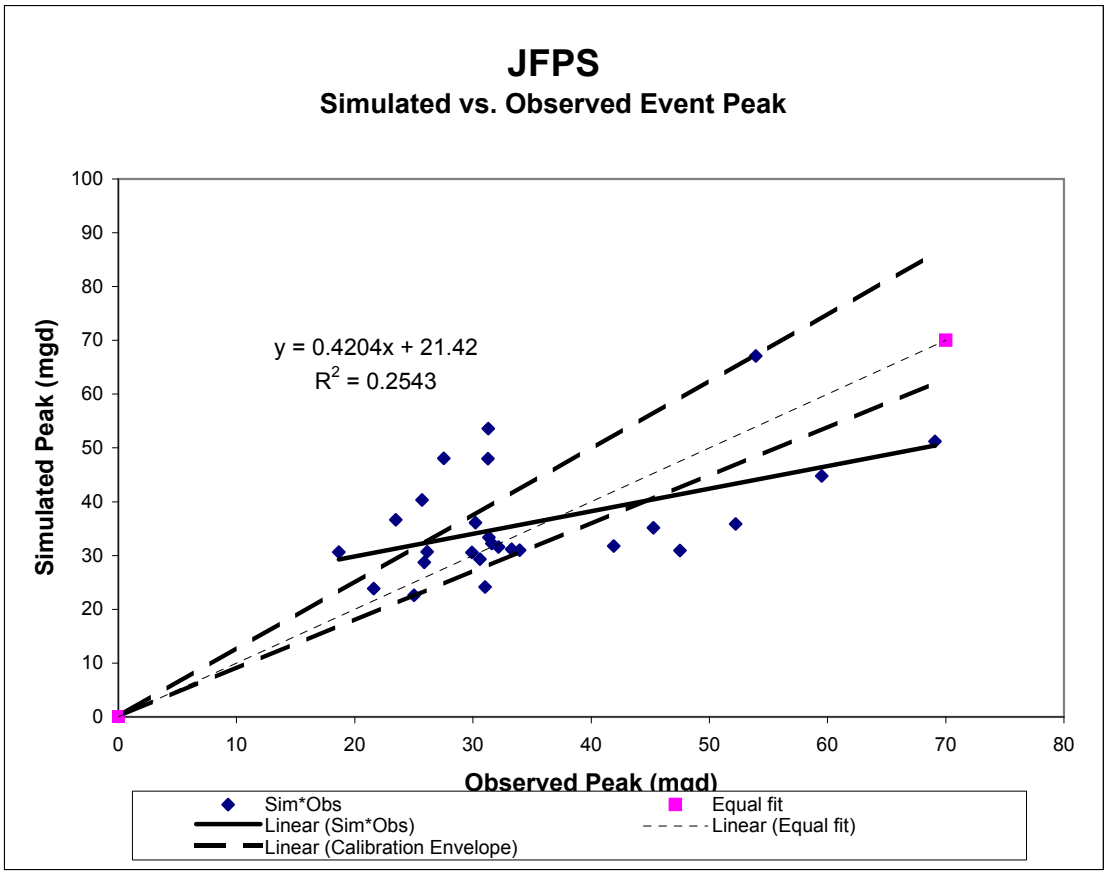
	JFOUT 75-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	21.424	34.674	62%	37.992	41.300	9%	8.662	7.221	-1.441
June 1, 2006	26.073	27.864	7%	33.887	23.052	-32%	7.991	6.491	-1.500
June 2, 2006	24.578	34.224	39%	33.887	45.584	35%	7.991	6.504	-1.487
June 19, 2006	20.820	28.612	37%	24.936	24.457	-2%	6.935	6.487	-0.448
June 25, 2006	39.162	42.844	9%	39.285	51.471	31%	12.986	9.000	-3.986
July 5, 2006									
July 22, 2006	26.991	32.497	20%	29.600	40.354	36%	7.501	6.411	-1.090
August 7, 2006	24.695	28.593	16%	22.231	22.394	1%	6.624	6.477	-0.147
September 1, 2006	3.304	3.196	-3%	6.776	2.744	-60%	4.216	1.870	-2.346
September 5, 2006									
September 14, 2006	35.289	33.395	-5%	26.828	23.847	-11%	7.586	6.593	-0.993
September 28, 2006	26.480	30.707	16%	23.112	26.235	14%	7.356	6.500	-0.856
October 5, 2006	32.208	33.880	5%	28.000	25.258	-10%	7.859	6.679	-1.180
October 17, 2006	24.064	31.199	30%	21.129	24.458	16%	8.612	6.747	-1.865
October 27, 2006	19.362	32.957	70%	21.980	25.420	16%	12.660	7.551	-5.109
November 7, 2006	30.724	32.392	5%	28.807	27.994	-3%	10.459	7.275	-3.184
November 16, 2006	30.928	31.337	1%	33.171	34.415	4%	13.051	9.151	-3.900
November 22, 2006	30.272	28.539	-6%	22.861	18.502	-19%	7.926	6.997	-0.929
December 22, 2006	25.756	30.180	17%	31.717	21.060	-34%	8.550	6.681	-1.869
January 1, 2007	34.822	29.957	-14%	31.696	25.036	-21%	8.102	6.846	-1.256
January 7, 2007	35.822	29.574	-17%	29.329	21.329	-27%	8.077	6.761	-1.316
March 1, 2007									
March 15, 2007									
April 4, 2007	28.257	28.038	-1%	23.487	18.396	-22%	6.805	6.599	-0.206
April 11, 2007	25.223	28.883	15%	26.024	19.578	-25%	7.345	6.877	-0.468
April 14, 2007	39.661	26.336	-34%	27.488	21.404	-22%	12.826	13.647	0.821


JFOUT
Simulated vs. Observed Event Volume
y = 0.5793x + 14.04
R2 = 0.4324
Simulated Volume (MG)
Observed Volume (MG)
0
5
10
15
20
25
30
35
40
45
50
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

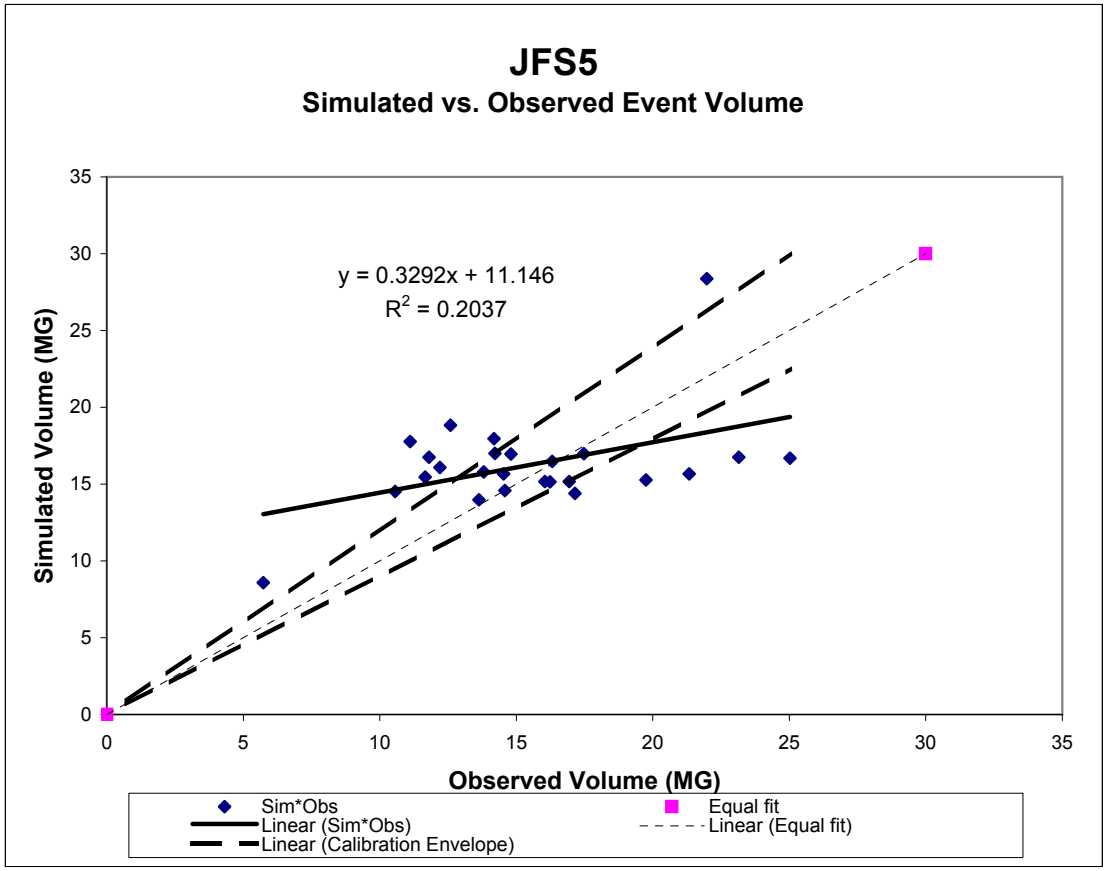

JFOUT
Simulated vs. Observed Event Peak
y = 1.2046x - 6.5262
R2 = 0.6224
Simulated Peak (mgd)
Observed Peak (mgd)
0
10
20
30
40
50
60
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

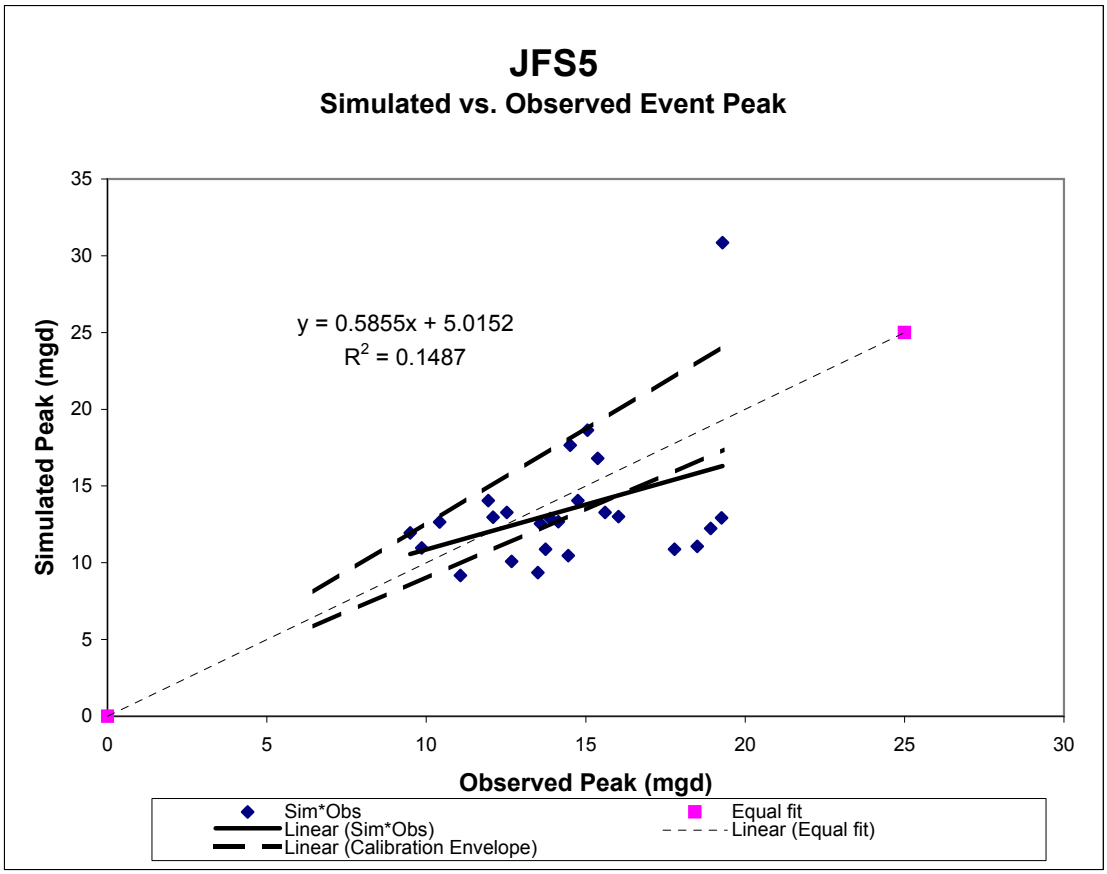
	JFPS 60-inch Diameter Pipe								
Storm Events	**Volume (mg) (-10% to+20%)**			**Peak Flow (mgd)(-10%to+25%)**			**Depth (ft.)(-0.25' to+1.5')**		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	30.83	41.679	35%	27.52	48.062	75%	3.852	7.06	3.208
June 1, 2006	12.704	17.989	42%	26.117	30.703	18%	3.847	4.845	0.998
June 2, 2006	17.559	27.242	55%	31.3	53.592	71%	4.366	7.244	2.878
June 19, 2006	28.169	36.055	28%	23.474	36.639	56%	3.608	4.432	0.824
June 25, 2006	45.563	66.872	47%	53.930	67.117	24%	8.681	7.649	-1.032
July 5, 2006	37.447	42.957	15%	31.271	48.024	54%	4.094	7.058	2.964
July 22, 2006	29.573	38.221	29%	25.679	40.322	57%	3.742	6.664	2.922
August 7, 2006	26.788	31.949	19%	21.599	23.828	10%	3.21	3.036	-0.174
September 1, 2006	35.521	41.258	16%	31.342	33.366	6%	4.205	4.841	0.636
September 5, 2006	28.360	37.789	33%	30.224	36.116	19%	4.139	3.596	-0.543
September 14, 2006	32.58	38.464	18%	25.882	28.744	11%	3.894	3.341	-0.553
September 28, 2006	27.858	35.519	28%	18.663	30.653	64%	3.287	4.832	1.545
October 5, 2006	38.004	39.003	3%	33.274	31.160	-6%	4.752	4.997	0.245
October 17, 2006	35.323	37.224	5%	31.605	32.224	2%	4.477	4.27	-0.207
October 27, 2006	45.512	39.016	-14%	41.916	31.772	-24%	6.199	3.576	-2.623
November 7, 2006	50.459	39.651	-21%	52.223	35.879	-31%	6.427	4.545	-1.882
November 16, 2006	59.459	43.318	-27%	69.098	51.234	-26%	9.315	7.213	-2.102
November 22, 2006	45.295	32.767	-28%	29.923	30.554	2%	4.438	4.362	-0.076
December 22, 2006	39.225	31.587	-19%	32.171	31.587	-2%	4.908	5.17	0.262
January 1, 2007	41.152	34.492	-16%	30.598	29.304	-4%	4.446	4.493	0.047
January 7, 2007	45.387	34.794	-23%	33.943	30.974	-9%	5.829	5.104	-0.725
March 1, 2007	31.839	35.093	10%	47.512	30.908	-35%	6.852	5.088	-1.764
March 15, 2007	44.387	43.115	-3%	45.257	35.165	-22%	6.514	3.932	-2.582
April 4, 2007	36.082	30.346	-16%	25.025	22.616	-10%	3.704	2.987	-0.717
April 11, 2007	37.187	32.217	-13%	31.034	24.134	-22%	3.760	3.032	-0.728
April 14, 2007	62.98	50.916	-19%	59.5	44.813	-25%	5.613	6.9	1.287


JFPS
Simulated vs. Observed Event Volume
y = 0.4614x + 20.545
R2 = 0.3635
Simulated Volume (MG)
Observed Volume (MG)
0
10
20
30
40
50
60
70
80
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

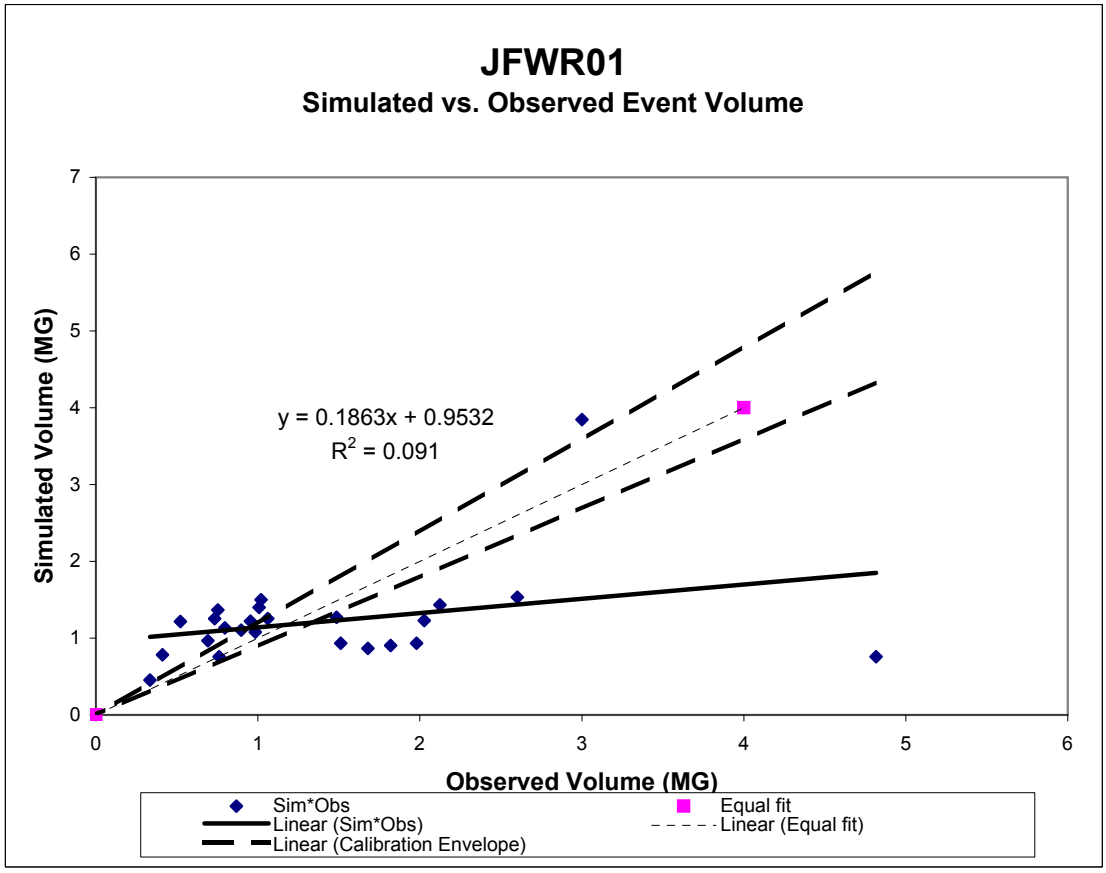

JFPS
Simulated vs. Observed Event Peak
y = 0.4204x + 21.42
R2 = 0.2543
Simulated Peak (mgd)
Observed Peak (mgd)
0
10
20
30
40
50
60
70
80
90
100
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

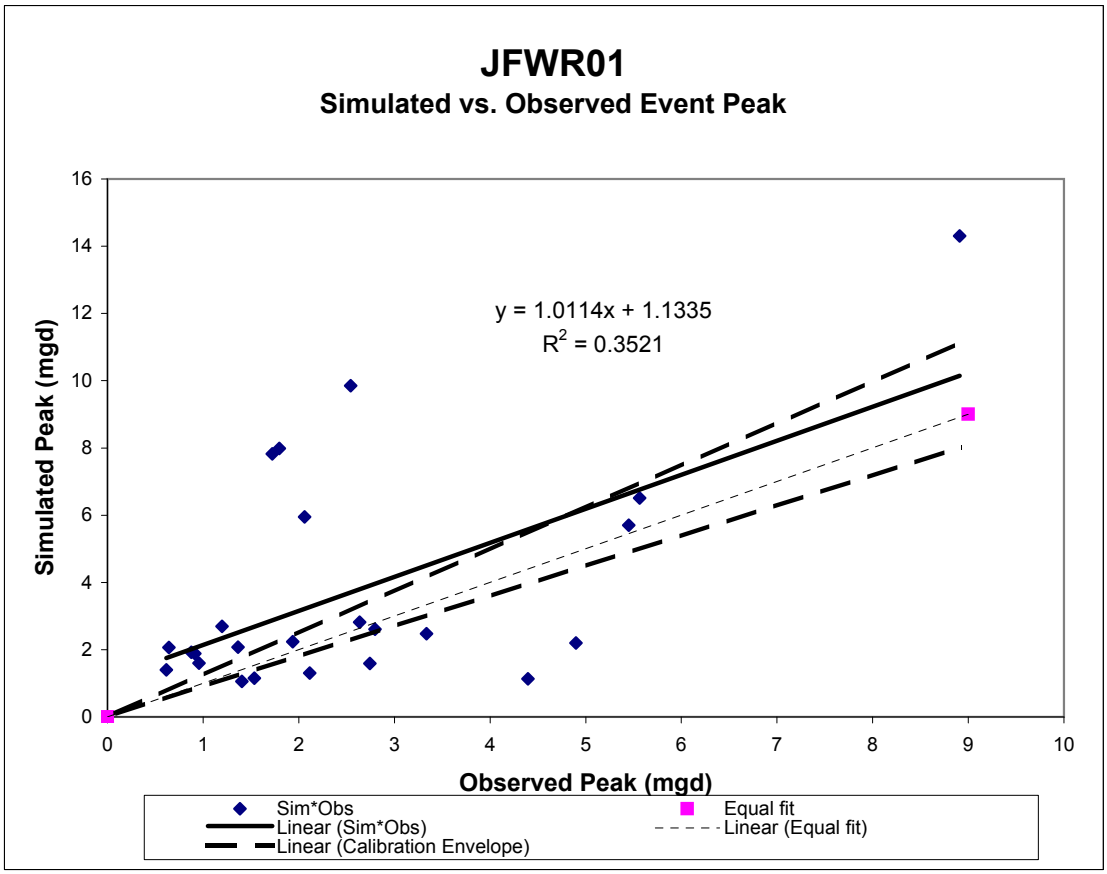
	JFS5 50-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	11.801	16.740	42%	14.510	17.658	22%	5.037	5.369	0.332
June 1, 2006	5.736	8.582	50%	9.499	11.949	26%	2.232	2.339	0.107
June 2, 2006	11.112	17.764	60%	15.060	18.636	24%	5.025	5.246	0.221
June 19, 2006									
June 25, 2006	21.982	28.379	29%	19.290	30.842	60%	6.743	6.049	-0.694
July 5, 2006	12.590	18.837	50%	15.380	16.803	9%	6.443	5.758	-0.685
July 22, 2006	12.198	16.079	32%	14.750	14.060	-5%	4.761	5.473	0.712
August 7, 2006	10.559	14.530	38%	9.856	10.955	11%	2.330	2.785	0.455
September 1, 2006	14.187	17.959	27%	11.940	14.040	18%	4.943	5.169	0.226
September 5, 2006	14.534	15.660	8%	12.530	13.284	6%	6.534	5.843	-0.691
September 14, 2006	14.803	16.955	15%	13.890	12.878	-7%	4.389	3.697	-0.692
September 28, 2006	11.666	15.462	33%	10.420	12.645	21%	3.300	4.370	1.070
October 5, 2006	14.218	17.003	20%	12.090	12.969	7%	4.358	4.801	0.443
October 17, 2006	13.811	15.790	14%	13.580	12.547	-8%	5.319	4.676	-0.643
October 27, 2006	17.476	16.985	-3%	14.140	12.671	-10%	5.666	5.258	-0.408
November 7, 2006	16.313	16.472	1%	15.610	13.276	-15%	5.621	5.331	-0.290
November 16, 2006	21.331	15.662	-27%	19.260	12.927	-33%	6.006	5.811	-0.195
November 22, 2006	17.153	14.395	-16%	13.500	9.359	-31%	4.543	2.745	-1.798
December 22, 2006	16.052	15.177	-5%	14.450	10.472	-28%	6.834	3.157	-3.677
January 1, 2007	16.230	15.141	-7%	16.030	12.999	-19%	4.846	5.142	0.296
January 7, 2007	16.937	15.160	-10%	13.740	10.873	-21%	4.665	3.241	-1.424
March 1, 2007	19.747	15.268	-23%	17.790	10.886	-39%	5.607	5.247	-0.360
March 15, 2007	23.148	16.740	-28%	18.920	12.233	-35%	5.604	5.360	-0.244
April 4, 2007	13.632	13.985	3%	11.070	9.167	-17%	3.225	2.176	-1.049
April 11, 2007	14.585	14.581	0%	12.680	10.090	-20%	4.407	2.844	-1.563
April 14, 2007	25.024	16.680	-33%	18.500	11.069	-40%	5.956	5.582	-0.374


JFS5
Simulated vs. Observed Event Volume
y = 0.3292x + 11.146
R2 = 0.2037
Simulated Volume (MG)
Observed Volume (MG)
0
5
10
15
20
25
30
35
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

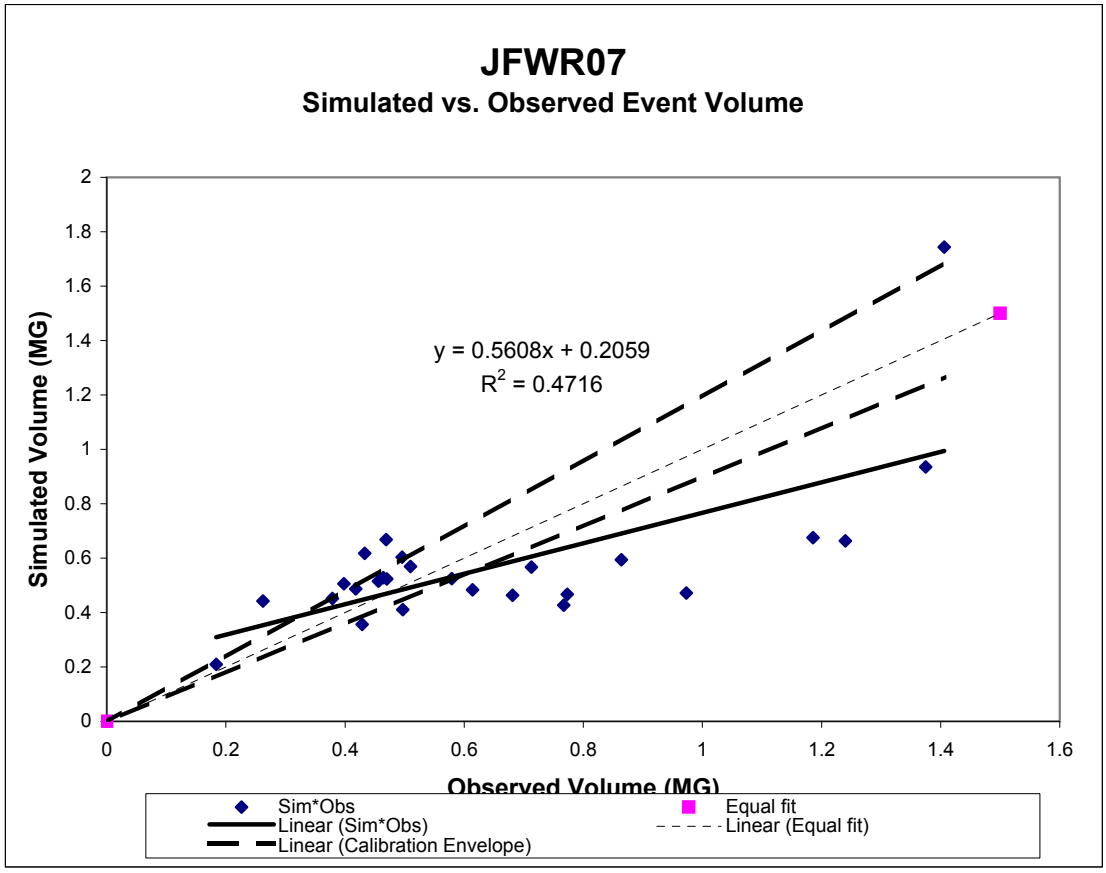

JFS5
Simulated vs. Observed Event Peak
y = 0.5855x + 5.0152
R2 = 0.1487
Simulated Peak (mgd)
Observed Peak (mgd)
0
5
10
15
20
25
30
35
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

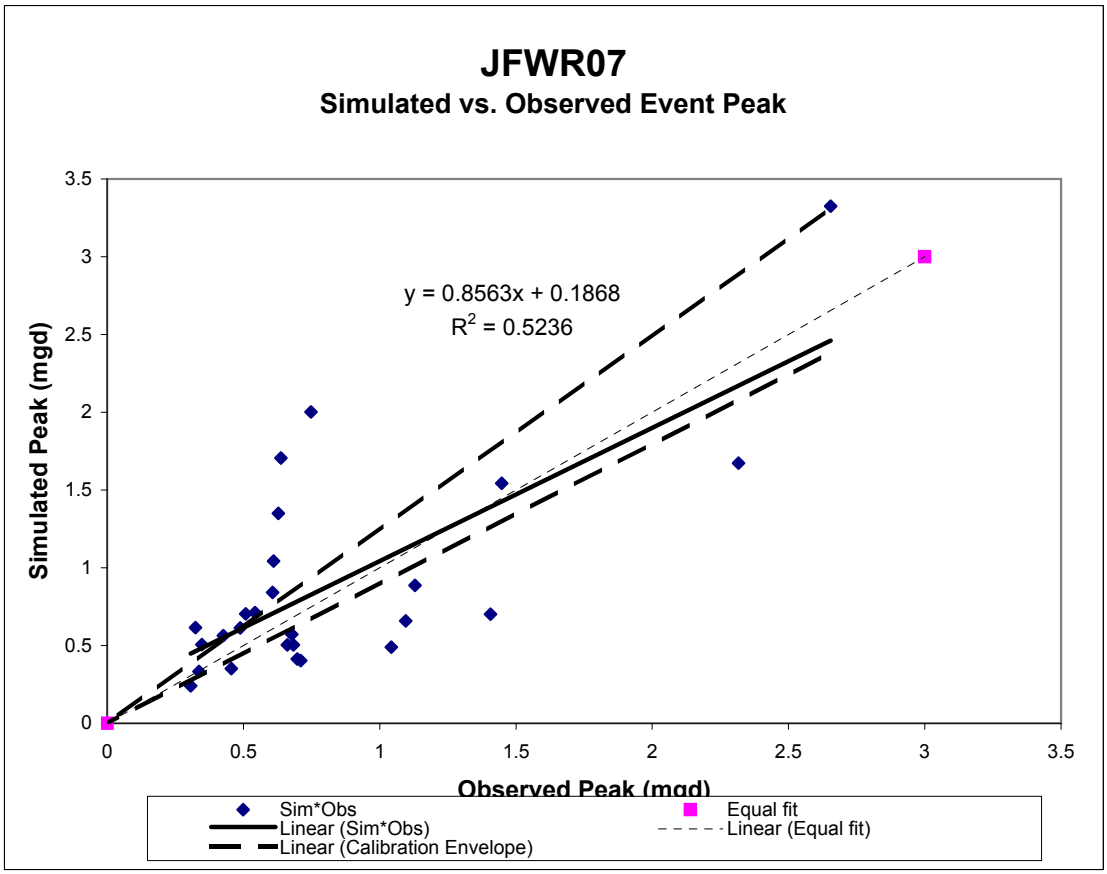
Storm Events	JFWR01 24-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.02	1.499	47%	1.797	7.987	344%	0.882	1.217	0.335
June 1, 2006	0.334	0.456	37%	0.644	2.069	221%	0.549	0.666	0.117
June 2, 2006	0.732	1.255	71%	5.563	6.506	17%	1.782	1.091	-0.691
June 19, 2006	0.896	1.106	23%	1.722	7.82	354%	0.778	1.2	0.422
June 25, 2006	3.001	3.847	28%	8.911	14.305	61%	10.416	9.624	-0.792
July 5, 2006	1.008	1.398	39%	2.061	5.946	189%	0.823	1.031	0.208
July 22, 2006	0.522	1.215	133%	2.543	9.850	287%	0.829	1.372	0.543
August 7, 2006	0.411	0.784	91%	0.614	1.4	128%	0.481	0.59	0.109
September 1, 2006	0.753	1.367	82%	0.875	1.922	120%	0.624	0.648	0.024
September 5, 2006	0.797	1.133	42%	1.197	2.692	125%	0.712	0.738	0.026
September 14, 2006	0.954	1.219	28%	0.915	1.881	106%	0.613	0.643	0.030
September 28, 2006	0.691	0.965	40%	4.897	2.198	-55%	1.803	0.683	-1.120
October 5, 2006	1.061	1.256	18%	0.956	1.602	68%	0.637	0.614	-0.023
October 17, 2006	0.983	1.08	10%	1.364	2.072	52%	0.73	0.667	-0.063
October 27, 2006	1.485	1.272	-14%	2.796	2.608	-7%	4.567	0.73	-3.837
November 7, 2006	2.027	1.231	-39%	2.638	2.821	7%	5.998	0.749	-5.249
November 16, 2006	2.124	1.434	-32%	5.451	5.700	5%	7.936	1.011	-6.925
November 22, 2006	0.760	0.758	0%	1.405	1.055	-25%	0.394	0.538	0.144
December 22, 2006	1.512	0.935	-38%	2.116	1.303	-38%	0.808	0.576	-0.232
January 1, 2007	1.679	0.867	-48%	1.938	2.239	16%	0.757	0.688	-0.069
January 7, 2007	1.819	0.904	-50%	1.535	1.149	-25%	0.733	0.553	-0.180
March 1, 2007	1.980	0.933	-53%	2.742	1.588	-42%	0.770	0.613	-0.157
March 15, 2007	2.601	1.532	-41%	3.335	2.474	-26%	1.101	0.717	-0.384
April 4, 2007									
April 11, 2007	4.817	0.760	-84%	4.395	1.137	-74%	1.017	0.551	-0.466
April 14, 2007									


JFWR01
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.1863x + 0.9532
R2 = 0.091
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

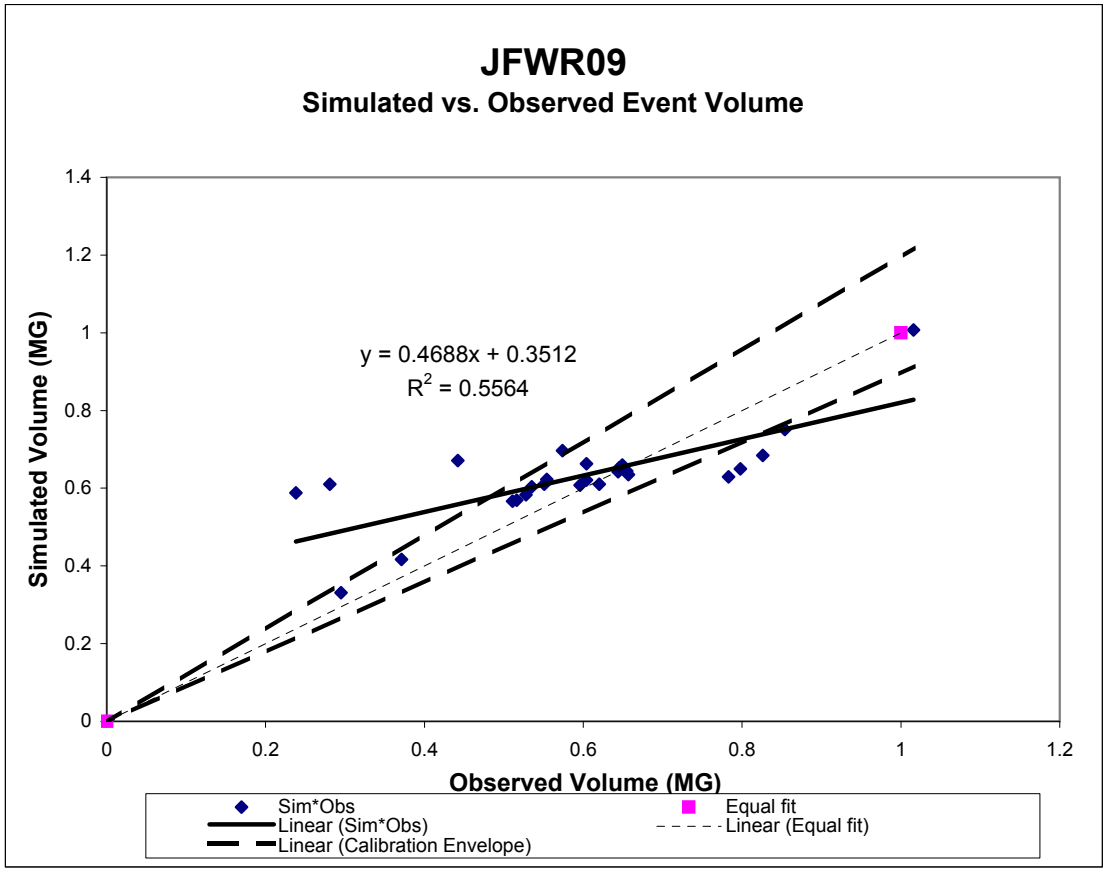

JFWR01
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.0114x + 1.1335
R2 = 0.3521
0
2
4
6
8
10
12
14
16
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

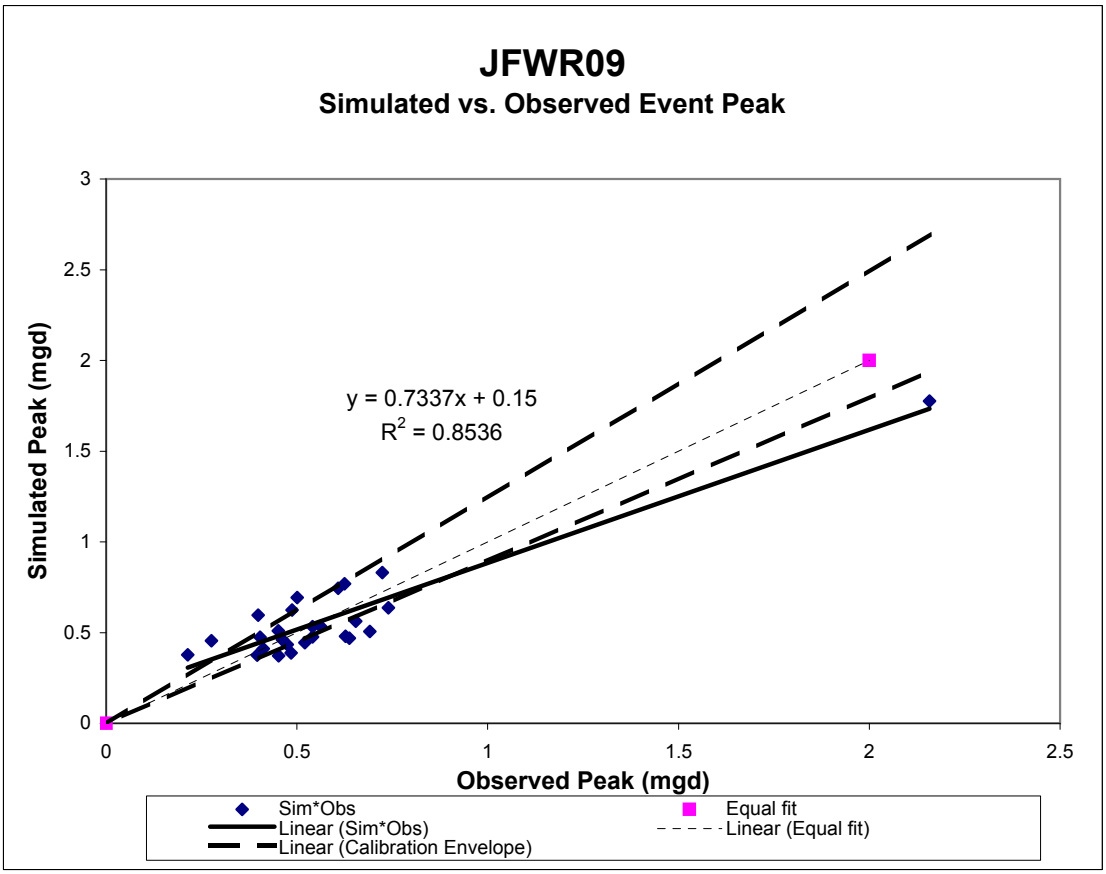
	JFWR07 12-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.469	0.668	42%	0.638	1.705	167%	0.384	0.57	0.186
June 1, 2006	0.184	0.210	14%	0.337	0.334	-1%	0.242	0.252	0.010
June 2, 2006	0.262	0.442	69%	0.628	1.349	115%	0.353	0.498	0.145
June 19, 2006	0.398	0.506	27%	0.61	1.043	71%	0.354	0.431	0.077
June 25, 2006	1.406	1.744	24%	2.655	3.325	25%	0.826	0.900	0.074
July 5, 2006	0.579	0.525	-9%	0.607	0.842	39%	0.402	0.386	-0.016
July 22, 2006	0.433	0.618	43%	0.748	2.003	168%	0.383	0.635	0.252
August 7, 2006	0.379	0.452	19%	0.347	0.506	46%	0.294	0.3	0.006
September 1, 2006	0.496	0.604	22%	0.488	0.614	26%	0.318	0.333	0.015
September 5, 2006	0.456	0.515	13%	0.542	0.712	31%	0.341	0.356	0.015
September 14, 2006	0.464	0.528	14%	0.683	0.505	-26%	0.396	0.3	-0.096
September 28, 2006	0.418	0.487	17%	0.324	0.615	90%	0.284	0.334	0.050
October 5, 2006	0.510	0.570	12%	0.426	0.564	32%	0.313	0.318	0.005
October 17, 2006	0.47	0.523	11%	0.508	0.703	38%	0.334	0.354	0.020
October 27, 2006	0.713	0.567	-20%	1.096	0.659	-40%	0.459	0.345	-0.114
November 7, 2006	0.864	0.594	-31%	1.129	0.887	-21%	0.465	0.399	-0.066
November 16, 2006	1.186	0.675	-43%	2.317	1.672	-28%	0.822	0.566	-0.256
November 22, 2006	0.767	0.427	-44%	0.710	0.404	-43%	0.354	0.275	-0.079
December 22, 2006	0.614	0.484	-21%	0.661	0.504	-24%	0.372	0.3	-0.072
January 1, 2007	0.681	0.463	-32%	0.677	0.572	-16%	0.376	0.321	-0.055
January 7, 2007	0.773	0.467	-40%	0.697	0.413	-41%	0.394	0.277	-0.117
March 1, 2007	0.973	0.472	-51%	1.043	0.489	-53%	0.431	0.295	-0.136
March 15, 2007	1.240	0.663	-47%	1.406	0.701	-50%	0.537	0.354	-0.183
April 4, 2007	0.429	0.357	-17%	0.306	0.241	-21%	0.274	0.218	-0.056
April 11, 2007	0.497	0.411	-17%	0.456	0.352	-23%	0.316	0.258	-0.058
April 14, 2007	1.375	0.935	-32%	1.448	1.544	7%	0.539	0.538	-0.001


JFWR07
Simulated vs. Observed Event Volume
y = 0.5608x + 0.2059
R2 = 0.4716
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

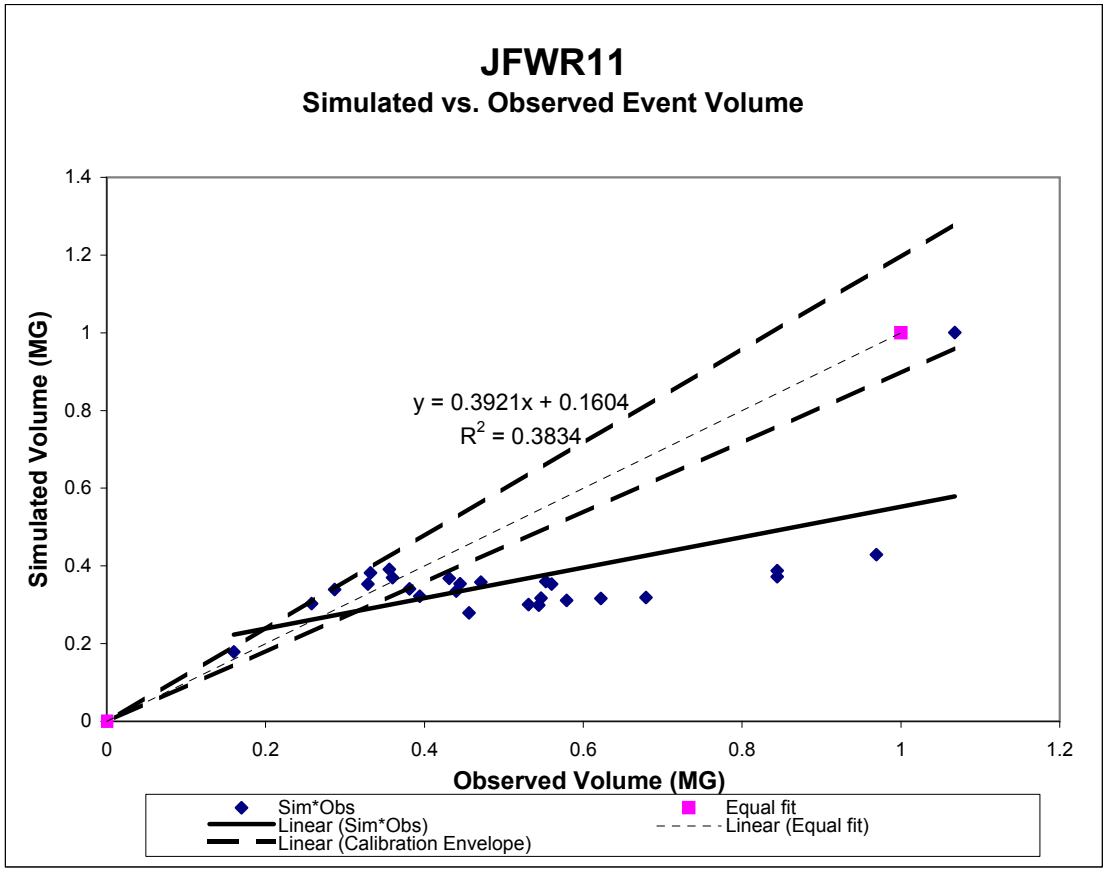

JFWR07
Simulated vs. Observed Event Peak
y = 0.8563x + 0.1868
R2 = 0.5236
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

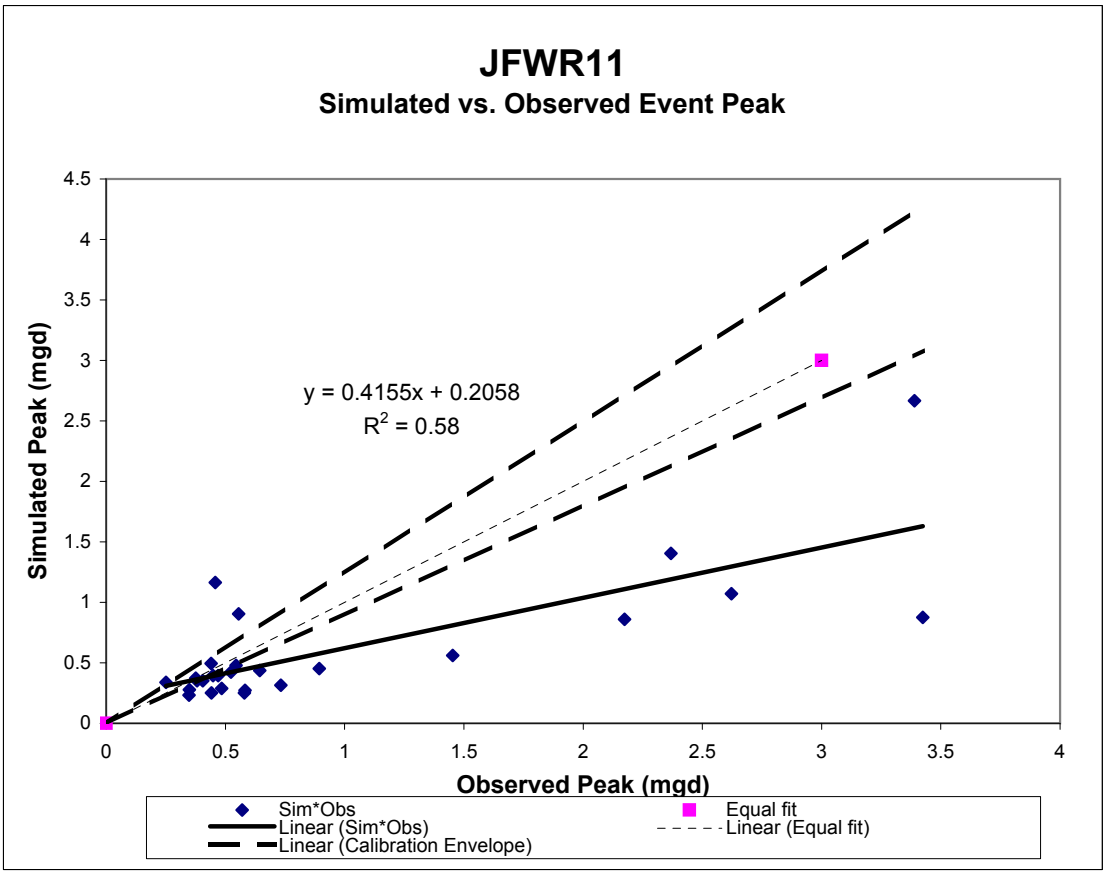
	JFWR09 10-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.604	0.663	10%	0.608	0.744	22%	0.26	0.389	0.129
June 1, 2006	0.295	0.331	12%	0.562	0.534	-5%	0.244	0.300	0.056
June 2, 2006	0.371	0.417	12%	0.724	0.831	15%	0.288	0.419	0.131
June 19, 2006	0.554	0.623	12%	0.487	0.625	28%	0.221	0.34	0.119
June 25, 2006	1.016	1.007	-1%	2.158	1.776	-18%	1.040	3.089	2.049
July 5, 2006	0.574	0.697	21%	0.501	0.694	39%	0.234	0.362	0.128
July 22, 2006	0.604	0.621	3%	0.398	0.597	50%	0.223	0.330	0.107
August 7, 2006	0.511	0.567	11%	0.452	0.372	-18%	0.221	0.235	0.014
September 1, 2006	0.649	0.660	2%	0.451	0.509	13%	0.226	0.291	0.065
September 5, 2006	0.657	0.635	-3%	0.541	0.533	-1%	0.249	0.299	0.050
September 14, 2006	0.645	0.652	1%	0.462	0.46	0%	0.23	0.276	0.046
September 28, 2006	0.620	0.610	-2%	0.521	0.445	-15%	0.238	0.270	0.032
October 5, 2006	0.644	0.642	0%	0.541	0.476	-12%	0.248	0.282	0.034
October 17, 2006	0.783	0.629	-20%	0.637	0.47	-26%	0.28	0.279	-0.001
October 27, 2006	0.798	0.65	-19%	0.627	0.48	-23%	0.274	0.283	0.009
November 7, 2006	0.655	0.644	-2%	0.654	0.562	-14%	0.277	0.313	0.036
November 16, 2006	0.442	0.671	52%	0.625	0.769	23%	0.274	0.400	0.126
November 22, 2006	0.238	0.588	147%	0.214	0.377	76%	0.152	0.236	0.084
December 22, 2006	0.551	0.61	11%	0.485	0.388	-20%	0.224	0.241	0.017
January 1, 2007	0.535	0.604	13%	0.403	0.474	18%	0.203	0.281	0.078
January 7, 2007	0.596	0.608	2%	0.475	0.434	-9%	0.232	0.265	0.033
March 1, 2007	0.281	0.610	117%	0.276	0.455	65%	0.170	0.274	0.104
March 15, 2007	0.826	0.684	-17%	0.691	0.507	-27%	0.289	0.290	0.001
April 4, 2007	0.516	0.569	10%	0.396	0.375	-5%	0.203	0.236	0.033
April 11, 2007	0.528	0.583	10%	0.412	0.411	0%	0.208	0.252	0.044
April 14, 2007	0.854	0.751	-12%	0.74	0.636	-14%	0.311	0.343	0.032


JFWR09
Simulated vs. Observed Event Volume
y = 0.4688x + 0.3512
R2 = 0.5564
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

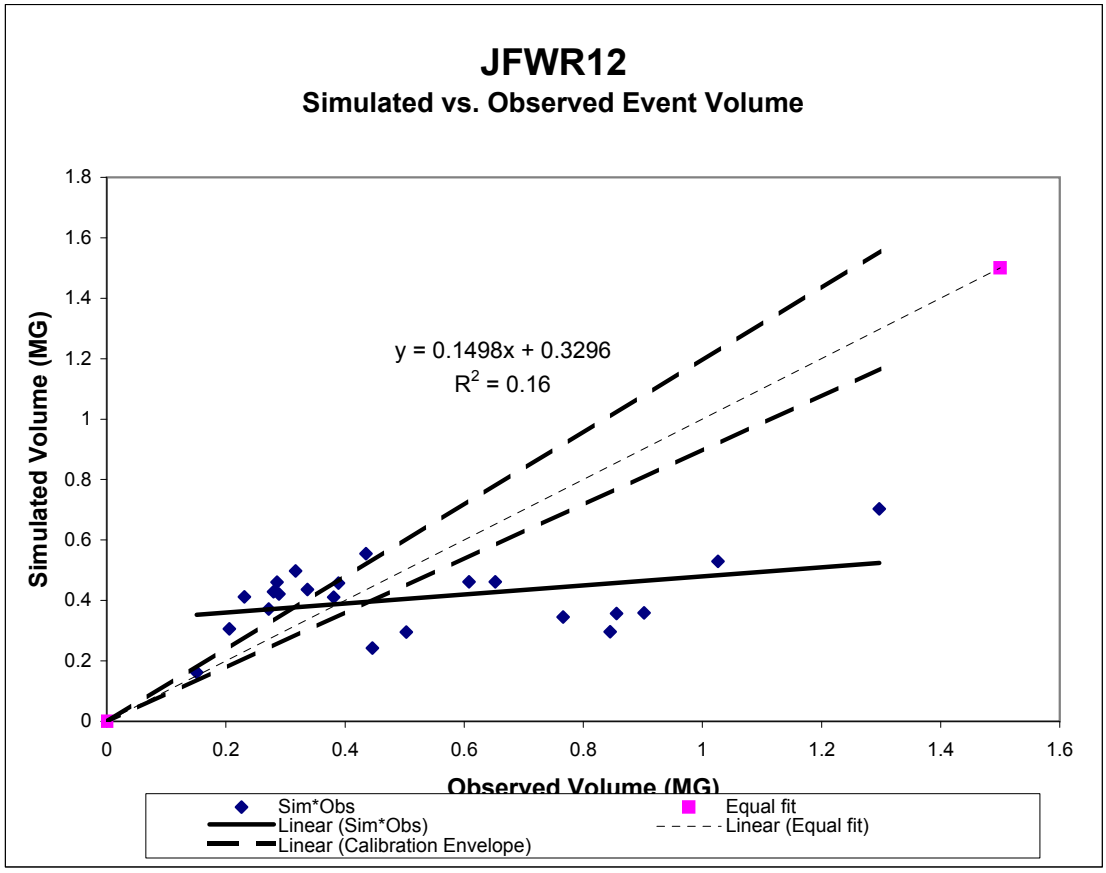

JFWR09
Simulated vs. Observed Event Peak
y = 0.7337x + 0.15
R2 = 0.8536
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

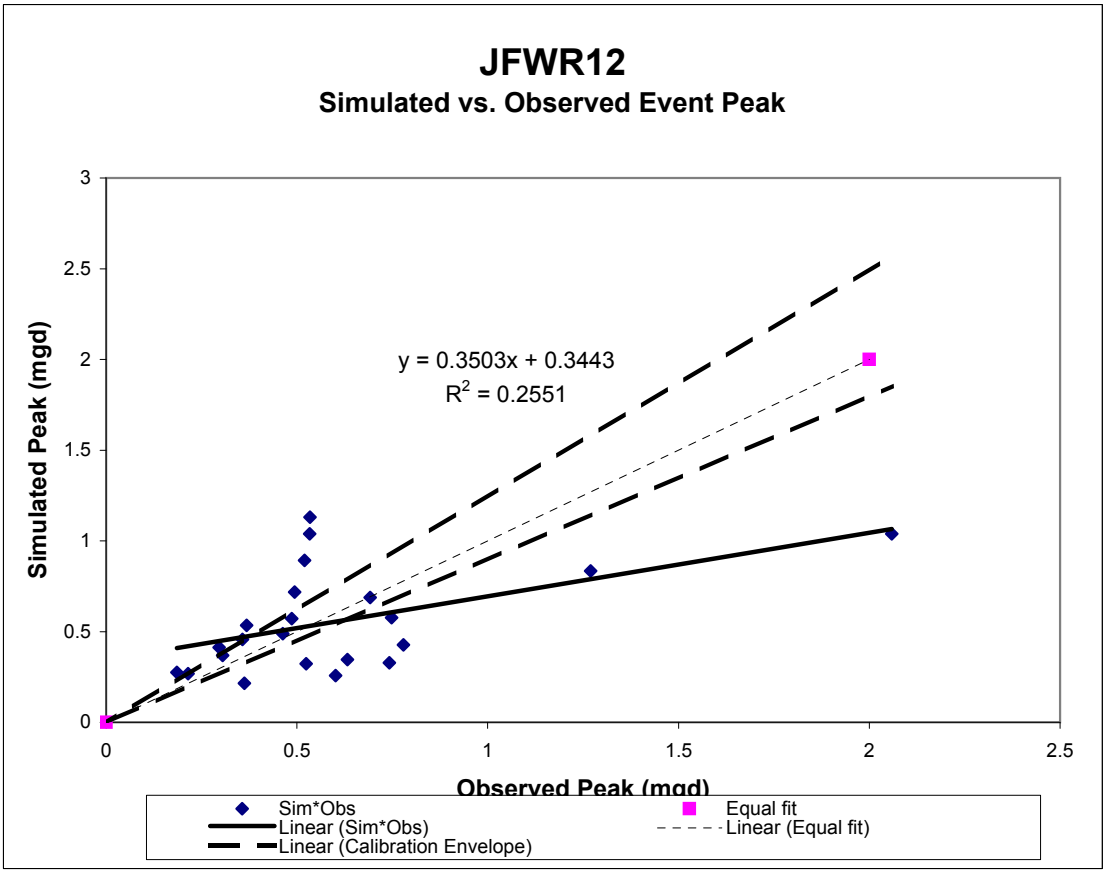
Storm Events	JFWR11 8-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.332	0.382	15%	0.458	1.163	154%	0.188	0.352	0.164
June 1, 2006	0.160	0.179	12%	0.251	0.338	35%	0.119	0.189	0.070
June 2, 2006	0.356	0.391	10%	2.174	0.859	-60%	0.715	0.296	-0.419
June 19, 2006	0.287	0.339	18%	2.622	1.072	-59%	1.038	0.335	-0.703
June 25, 2006	1.068	1.001	-6%	3.389	2.666	-21%	1.962	1.392	-0.570
July 5, 2006	0.360	0.370	3%	0.556	0.905	63%	0.205	0.306	0.101
July 22, 2006	0.329	0.353	7%	2.369	1.405	-41%	0.712	0.392	-0.320
August 7, 2006	0.258	0.303	17%	0.349	0.278	-20%	0.159	0.174	0.015
September 1, 2006	0.431	0.368	-15%	0.376	0.372	-1%	0.145	0.196	0.051
September 5, 2006	0.381	0.341	-10%	0.440	0.495	13%	0.169	0.227	0.058
September 14, 2006	0.445	0.354	-20%	0.381	0.351	-8%	0.155	0.191	0.036
September 28, 2006	0.394	0.322	-18%	0.448	0.395	-12%	0.173	0.201	0.028
October 5, 2006	0.471	0.358	-24%	0.405	0.353	-13%	0.160	0.192	0.032
October 17, 2006	0.440	0.335	-24%	0.469	0.394	-16%	0.168	0.201	0.033
October 27, 2006	0.553	0.360	-35%	0.644	0.437	-32%	0.198	0.212	0.014
November 7, 2006	0.560	0.353	-37%	0.545	0.478	-12%	0.187	0.223	0.036
November 16, 2006	0.844	0.372	-56%	3.425	0.875	-74%	0.718	0.299	-0.419
November 22, 2006	0.544	0.299	-45%	0.442	0.251	-43%	0.152	0.166	0.014
December 22, 2006	0.547	0.317	-42%	0.582	0.273	-53%	0.174	0.173	-0.001
January 1, 2007	0.579	0.311	-46%	0.523	0.422	-19%	0.181	0.208	0.027
January 7, 2007	0.622	0.316	-49%	0.485	0.289	-40%	0.176	0.177	0.001
March 1, 2007	0.679	0.319	-53%	0.733	0.314	-57%	0.210	0.184	-0.026
March 15, 2007	0.844	0.388	-54%	0.894	0.452	-49%	0.253	0.216	-0.037
April 4, 2007	0.456	0.279	-39%	0.348	0.232	-33%	0.150	0.160	0.010
April 11, 2007	0.531	0.301	-43%	0.580	0.251	-57%	0.183	0.166	-0.017
April 14, 2007	0.969	0.429	-56%	1.453	0.561	-61%	0.348	0.239	-0.109


JFWR11
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3921x + 0.1604
R2 = 0.3834
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

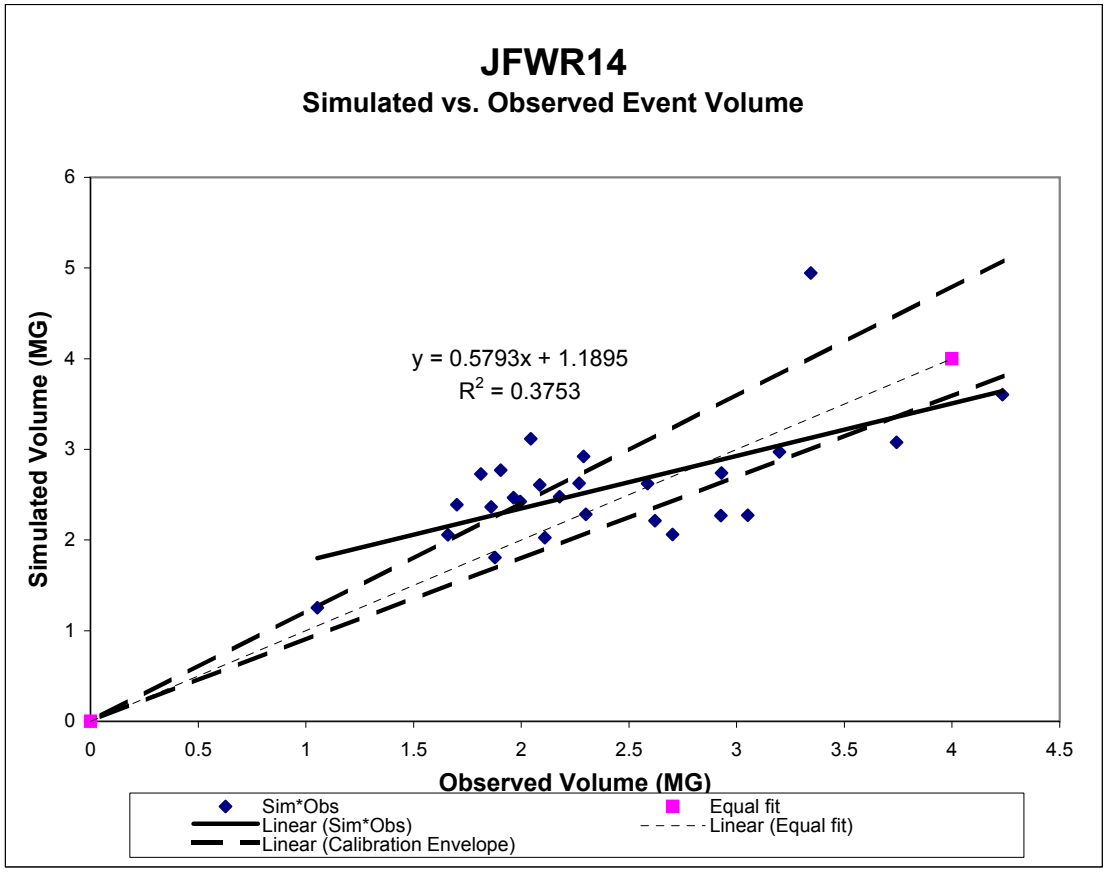

JFWR11
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.4155x + 0.2058
R2 = 0.58
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

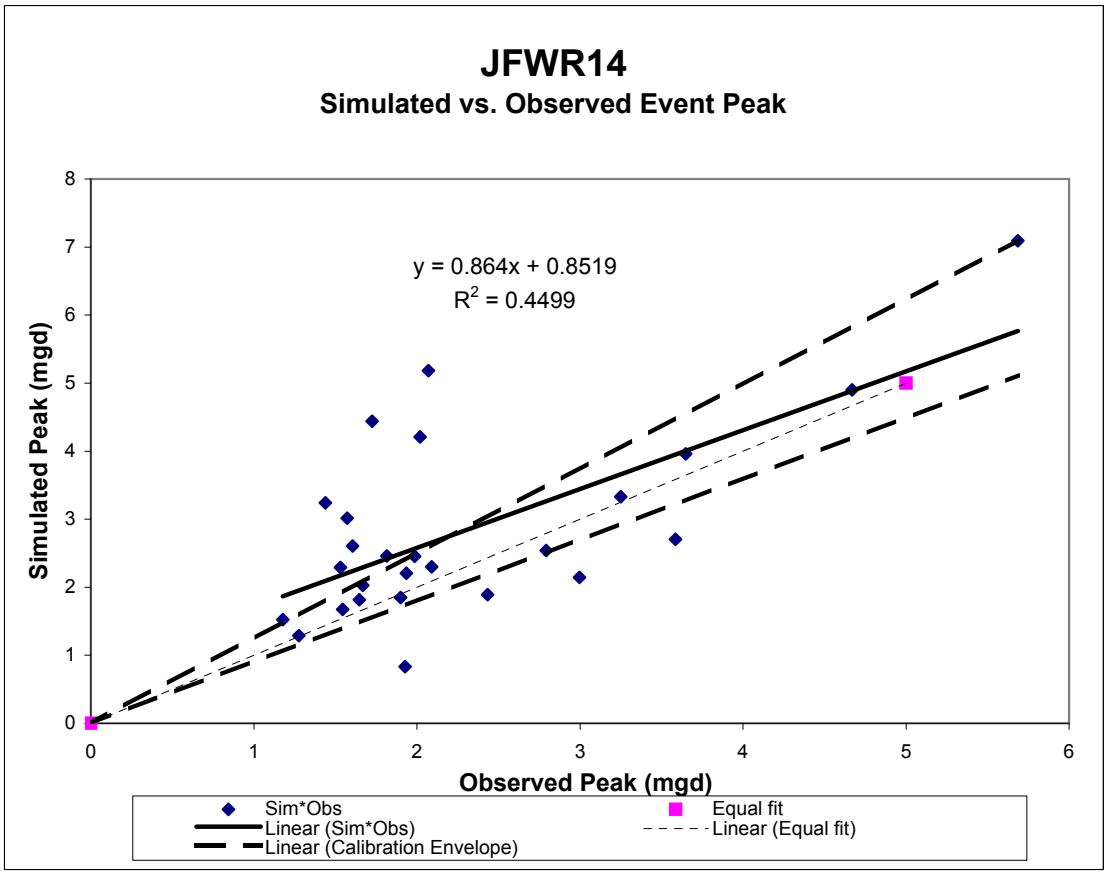
Storm Events	JFWR12 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.435	0.555	28%	0.533	1.038	95%	0.261	0.325	0.064
June 1, 2006	0.151	0.162	7%	0.215	0.268	25%	0.155	0.176	0.021
June 2, 2006	0.231	0.412	78%	0.534	1.13	112%	0.257	0.342	0.085
June 19, 2006	0.289	0.421	46%	0.494	0.718	45%	0.252	0.271	0.019
June 25, 2006									
July 5, 2006									
July 22, 2006	0.286	0.461	61%	0.520	0.893	72%	0.254	0.300	0.046
August 7, 2006	0.206	0.306	49%	0.185	0.275	49%	0.149	0.178	0.029
September 1, 2006	0.317	0.498	57%	0.368	0.534	45%	0.208	0.236	0.028
September 5, 2006	0.280	0.429	53%	0.486	0.572	18%	0.254	0.242	-0.012
September 14, 2006	0.337	0.436	29%	0.305	0.369	21%	0.181	0.2	0.019
September 28, 2006	0.272	0.372	37%	0.296	0.413	40%	0.174	0.211	0.037
October 5, 2006	0.389	0.457	17%	0.357	0.456	28%	0.189	0.221	0.032
October 17, 2006	0.381	0.411	8%	0.463	0.489	6%	0.224	0.228	0.004
October 27, 2006	0.608	0.462	-24%	0.748	0.577	-23%	0.29	0.242	-0.048
November 7, 2006	0.652	0.462	-29%	0.692	0.687	-1%	0.282	0.265	-0.017
November 16, 2006	1.026	0.529	-48%	2.059	1.038	-50%	0.632	0.325	-0.307
November 22, 2006	0.845	0.297	-65%	0.601	0.258	-57%	0.264	0.174	-0.090
December 22, 2006	0.856	0.357	-58%	0.742	0.328	-56%	0.294	0.189	-0.105
January 1, 2007									
January 7, 2007	0.766	0.345	-55%	0.632	0.345	-45%	0.27	0.194	-0.076
March 1, 2007	0.902	0.359	-60%	0.779	0.427	-45%	0.294	0.215	-0.079
March 15, 2007									
April 4, 2007	0.446	0.242	-46%	0.362	0.216	-40%	0.190	0.164	-0.026
April 11, 2007	0.503	0.295	-41%	0.524	0.323	-38%	0.238	0.188	-0.050
April 14, 2007	1.297	0.703	-46%	1.27	0.834	-34%	0.416	0.292	-0.124


JFWR12
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.1498x + 0.3296
R2 = 0.16
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

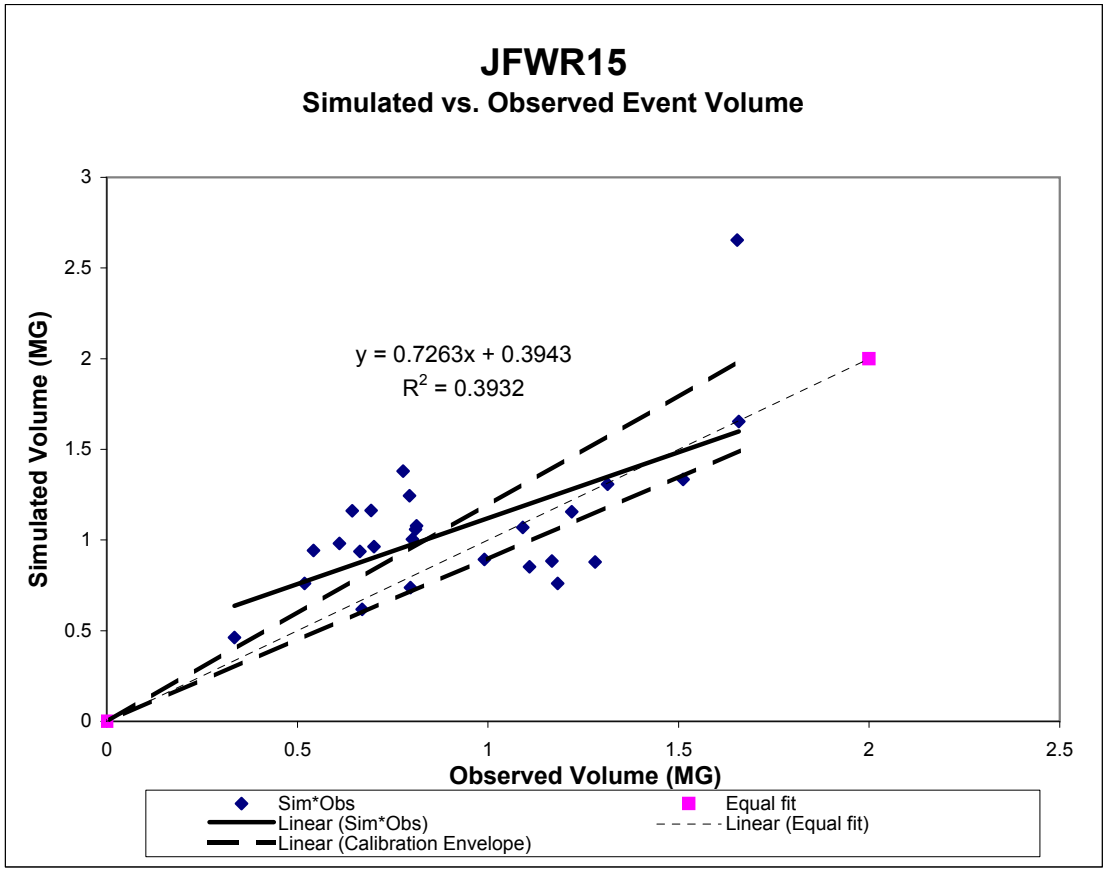

JFWR12
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.3503x + 0.3443
R2 = 0.2551
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

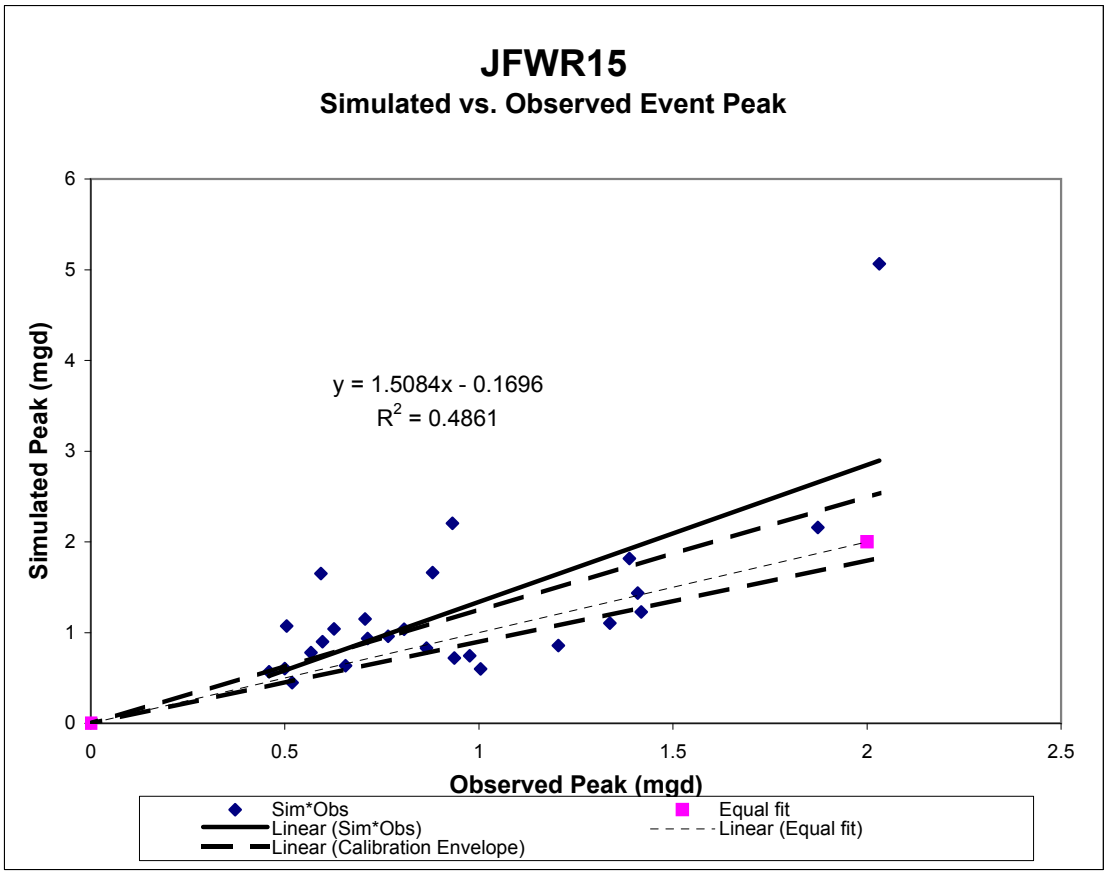
	JFWR14 15-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.044	3.117	52%	2.071	5.185	150%	0.501	0.822	0.321
June 1, 2006	1.054	1.254	19%	1.647	1.817	10%	0.483	0.483	0.000
June 2, 2006	2.290	2.923	28%	2.020	4.209	108%	0.508	0.729	0.221
June 19, 2006	1.701	2.390	41%	1.438	3.242	125%	0.435	0.635	0.200
June 25, 2006	3.345	4.943	48%	5.686	7.091	25%	3.736	1.071	-2.665
July 5, 2006	2.086	2.608	25%	1.573	3.016	92%	0.424	0.617	0.193
July 22, 2006	1.812	2.729	51%	1.726	4.441	157%	0.493	0.755	0.262
August 7, 2006	1.659	2.056	24%	1.177	1.523	29%	0.417	0.446	0.029
September 1, 2006	1.905	2.772	46%	1.605	2.604	62%	0.441	0.571	0.130
September 5, 2006	1.995	2.424	22%	1.815	2.462	36%	0.484	0.554	0.070
September 14, 2006	1.964	2.466	26%	1.668	2.026	21%	0.482	0.510	0.028
September 28, 2006	1.860	2.363	27%	1.530	2.292	50%	0.441	0.537	0.096
October 5, 2006	2.269	2.627	16%	2.091	2.301	10%	0.527	0.538	0.011
October 17, 2006	2.178	2.479	14%	1.986	2.457	24%	0.537	0.554	0.017
October 27, 2006	2.586	2.624	1%	2.793	2.540	-9%	0.599	0.563	-0.036
November 7, 2006	2.929	2.739	-6%	3.251	3.328	2%	1.625	0.643	-0.982
November 16, 2006	3.199	2.972	-7%	4.669	4.899	5%	2.527	0.801	-1.726
November 22, 2006	2.703	2.061	-24%	1.927	0.833	-57%	0.505	0.457	-0.048
December 22, 2006	2.300	2.285	-1%	1.900	1.849	-3%	0.470	0.487	0.017
January 1, 2007	2.620	2.214	-15%	1.935	2.205	14%	0.482	0.529	0.047
January 7, 2007	2.927	2.270	-22%	2.434	1.890	-22%	0.562	0.493	-0.069
March 1, 2007	3.051	2.273	-25%	2.998	2.145	-28%	0.602	0.523	-0.079
March 15, 2007	3.742	3.077	-18%	3.585	2.704	-25%	0.683	0.584	-0.099
April 4, 2007	1.878	1.806	-4%	1.275	1.289	1%	0.358	0.416	0.058
April 11, 2007	2.110	2.026	-4%	1.545	1.673	8%	0.422	0.464	0.042
April 14, 2007	4.234	3.602	-15%	3.648	3.959	9%	1.903	0.710	-1.193


JFWR14
Simulated vs. Observed Event Volume
y = 0.5793x + 1.1895
R2 = 0.3753
Simulated Volume (MG)
Observed Volume (MG)
0
1
2
3
4
5
6
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

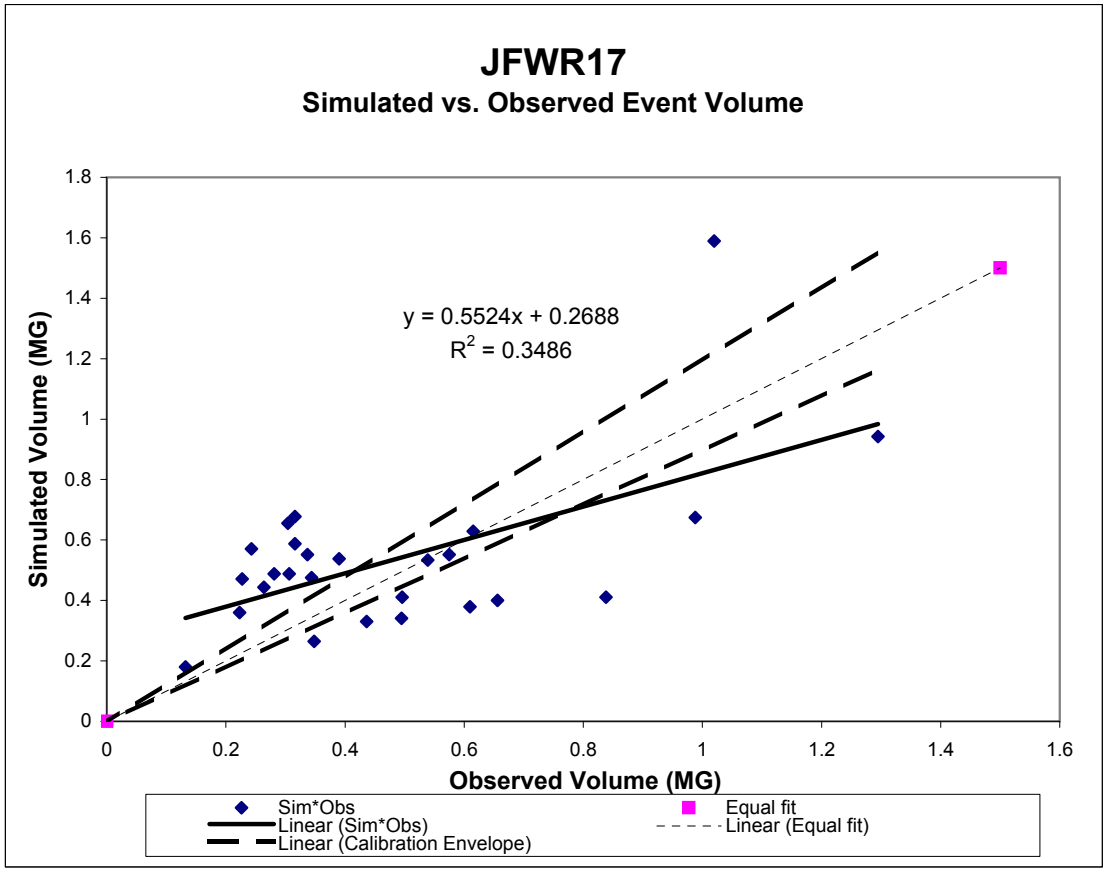

JFWR14
Simulated vs. Observed Event Peak
y = 0.864x + 0.8519
R2 = 0.4499
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
8
0
1
2
3
4
5
6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

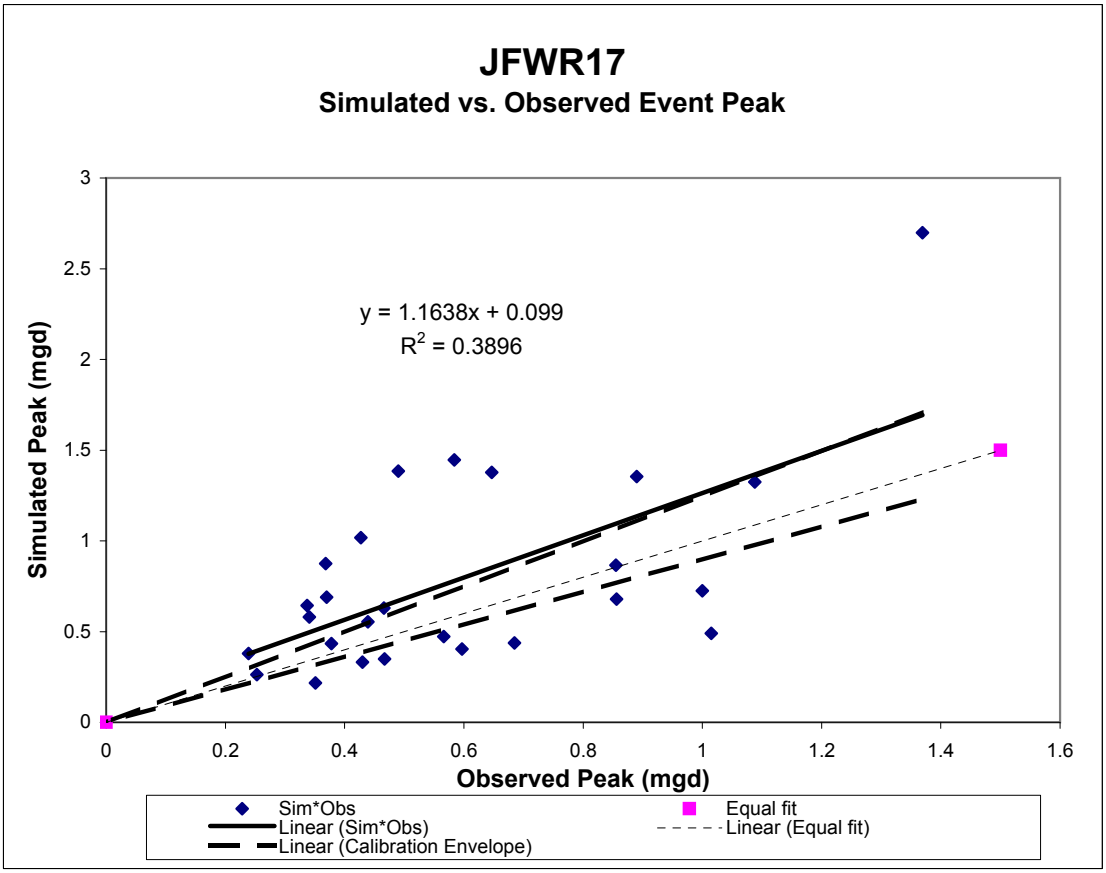
Storm Events	JFWR15 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.777	1.380	78%	0.932	2.206	137%	0.416	0.720	0.304
June 1, 2006	0.335	0.463	38%	0.500	0.603	21%	0.335	0.382	0.047
June 2, 2006	0.794	1.245	57%	0.881	1.662	89%	0.405	0.619	0.214
June 19, 2006	0.542	0.942	74%	0.505	1.071	112%	0.312	0.503	0.191
June 25, 2006	1.654	2.654	60%	2.032	5.065	149%	0.611	7.889	7.278
July 5, 2006	0.810	1.058	31%	0.627	1.042	66%	0.389	0.496	0.107
July 22, 2006	0.644	1.161	80%	0.593	1.650	178%	0.387	0.617	0.230
August 7, 2006	0.519	0.761	47%	0.459	0.568	24%	0.407	0.370	-0.037
September 1, 2006	0.693	1.163	68%	0.707	1.151	63%	0.375	0.520	0.145
September 5, 2006	0.701	0.964	38%	0.766	0.961	25%	0.498	0.477	-0.021
September 14, 2006	0.610	0.982	61%	0.567	0.779	37%	0.429	0.436	0.007
September 28, 2006	0.664	0.937	41%	0.597	0.898	50%	0.409	0.462	0.053
October 5, 2006	0.813	1.078	33%	0.713	0.934	31%	0.419	0.470	0.051
October 17, 2006	0.802	1.005	25%	0.807	1.036	28%	0.414	0.495	0.081
October 27, 2006	1.091	1.069	-2%	1.337	1.104	-17%	0.563	0.510	-0.053
November 7, 2006	1.220	1.156	-5%	1.409	1.435	2%	0.515	0.575	0.060
November 16, 2006	1.314	1.307	-1%	1.873	2.158	15%	0.710	0.713	0.003
November 22, 2006	1.183	0.761	-36%	1.004	0.600	-40%	0.527	0.380	-0.147
December 22, 2006	0.991	0.893	-10%	0.937	0.721	-23%	0.423	0.420	-0.003
January 1, 2007	1.109	0.852	-23%	0.865	0.829	-4%	0.417	0.447	0.030
January 7, 2007	1.168	0.884	-24%	0.976	0.746	-24%	0.405	0.427	0.022
March 1, 2007	1.281	0.879	-31%	1.205	0.856	-29%	0.473	0.452	-0.021
March 15, 2007	1.512	1.335	-12%	1.418	1.227	-13%	0.539	0.534	-0.005
April 4, 2007	0.670	0.618	-8%	0.519	0.448	-14%	0.314	0.334	0.020
April 11, 2007	0.797	0.737	-8%	0.656	0.636	-3%	0.352	0.393	0.041
April 14, 2007	1.658	1.654	0%	1.388	1.817	31%	0.494	0.644	0.150


JFWR15
Simulated vs. Observed Event Volume
y = 0.7263x + 0.3943
R2 = 0.3932
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

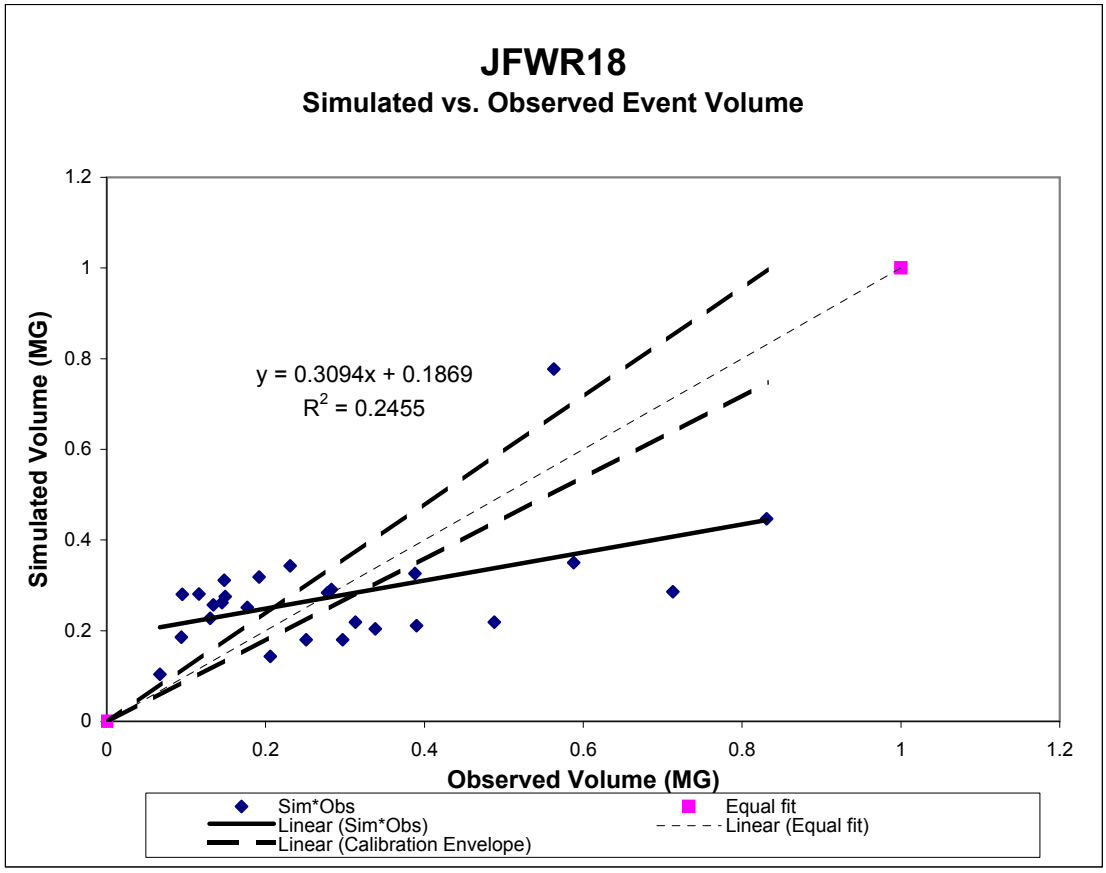

JFWR15
Simulated vs. Observed Event Peak
y = 1.5084x - 0.1696
R2 = 0.4861
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
0.5
1.5
2.5
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

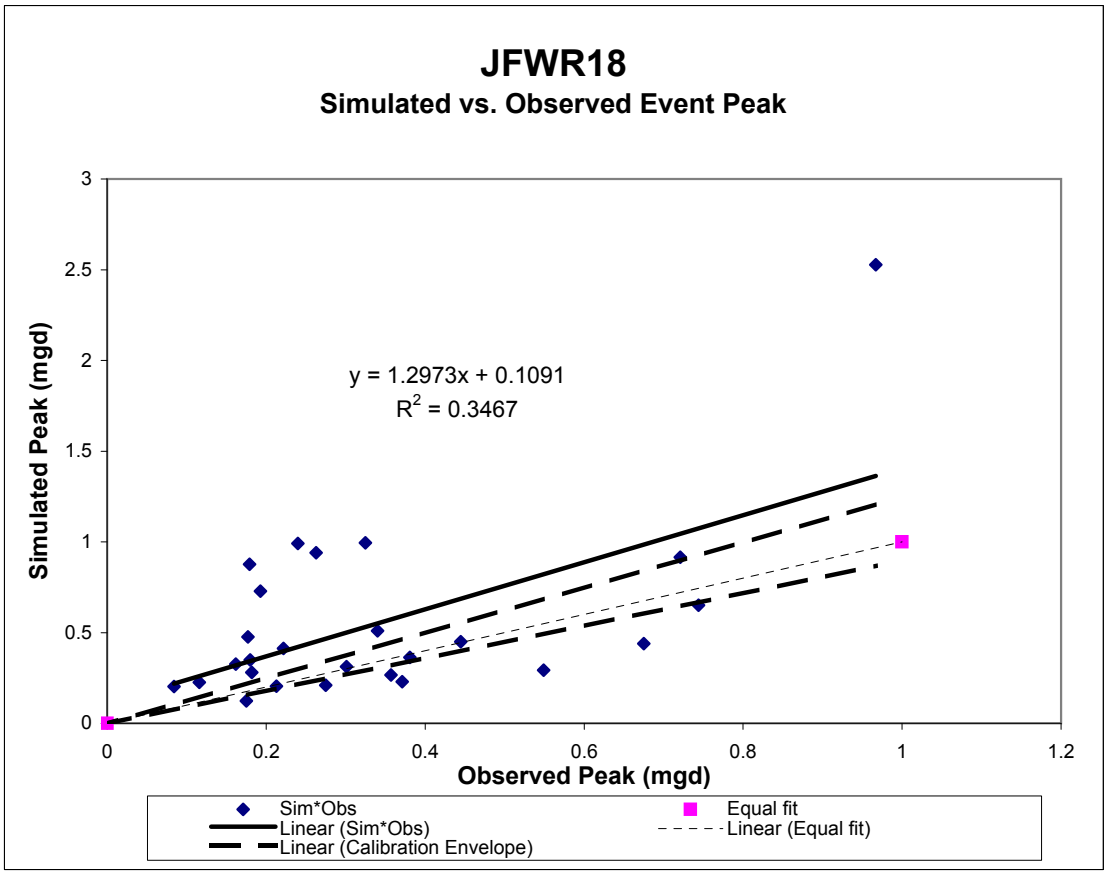
Storm Events	JFWR17 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.316	0.678	115%	0.584	1.447	148%	0.462	0.671	0.209
June 1, 2006	0.132	0.180	36%	0.253	0.263	4%	0.315	0.284	-0.031
June 2, 2006	0.304	0.655	115%	0.490	1.384	182%	0.455	0.658	0.203
June 19, 2006	0.227	0.471	107%	0.368	0.874	138%	0.374	0.524	0.150
June 25, 2006	1.020	1.589	56%	1.369	2.699	97%	0.701	0.750	0.049
July 5, 2006	0.337	0.552	64%	0.427	1.018	138%	0.429	0.566	0.137
July 22, 2006	0.243	0.571	135%	0.647	1.377	113%	0.532	0.656	0.124
August 7, 2006	0.223	0.360	61%	0.239	0.379	59%	0.330	0.341	0.011
September 1, 2006	0.316	0.588	86%	0.337	0.643	91%	0.342	0.447	0.105
September 5, 2006	0.281	0.488	74%	0.370	0.690	86%	0.348	0.464	0.116
September 14, 2006	0.306	0.488	59%	0.378	0.434	15%	0.372	0.366	-0.006
September 28, 2006	0.264	0.444	68%	0.341	0.581	70%	0.358	0.425	0.067
October 5, 2006	0.390	0.538	38%	0.439	0.554	26%	0.383	0.414	0.031
October 17, 2006	0.344	0.475	38%	0.466	0.630	35%	0.373	0.443	0.070
October 27, 2006	0.539	0.534	-1%	0.856	0.679	-21%	0.557	0.460	-0.097
November 7, 2006	0.575	0.552	-4%	0.855	0.866	1%	0.555	0.521	-0.034
November 16, 2006	0.615	0.629	2%	0.890	1.354	52%	0.612	0.651	0.039
November 22, 2006	0.495	0.341	-31%	0.467	0.349	-25%	0.418	0.327	-0.091
December 22, 2006	0.496	0.411	-17%	0.685	0.438	-36%	0.424	0.368	-0.056
January 1, 2007	0.610	0.379	-38%	0.566	0.472	-17%	0.502	0.382	-0.120
January 7, 2007	0.656	0.400	-39%	0.597	0.403	-32%	0.429	0.352	-0.077
March 1, 2007	0.838	0.411	-51%	1.015	0.490	-52%	0.549	0.389	-0.160
March 15, 2007	0.988	0.674	-32%	1.000	0.725	-28%	0.579	0.476	-0.103
April 4, 2007	0.348	0.265	-24%	0.351	0.217	-38%	0.325	0.259	-0.066
April 11, 2007	0.436	0.330	-24%	0.430	0.332	-23%	0.348	0.319	-0.029
April 14, 2007	1.295	0.942	-27%	1.088	1.324	22%	0.625	0.644	0.019


JFWR17
Simulated vs. Observed Event Volume
y = 0.5524x + 0.2688
R2 = 0.3486
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

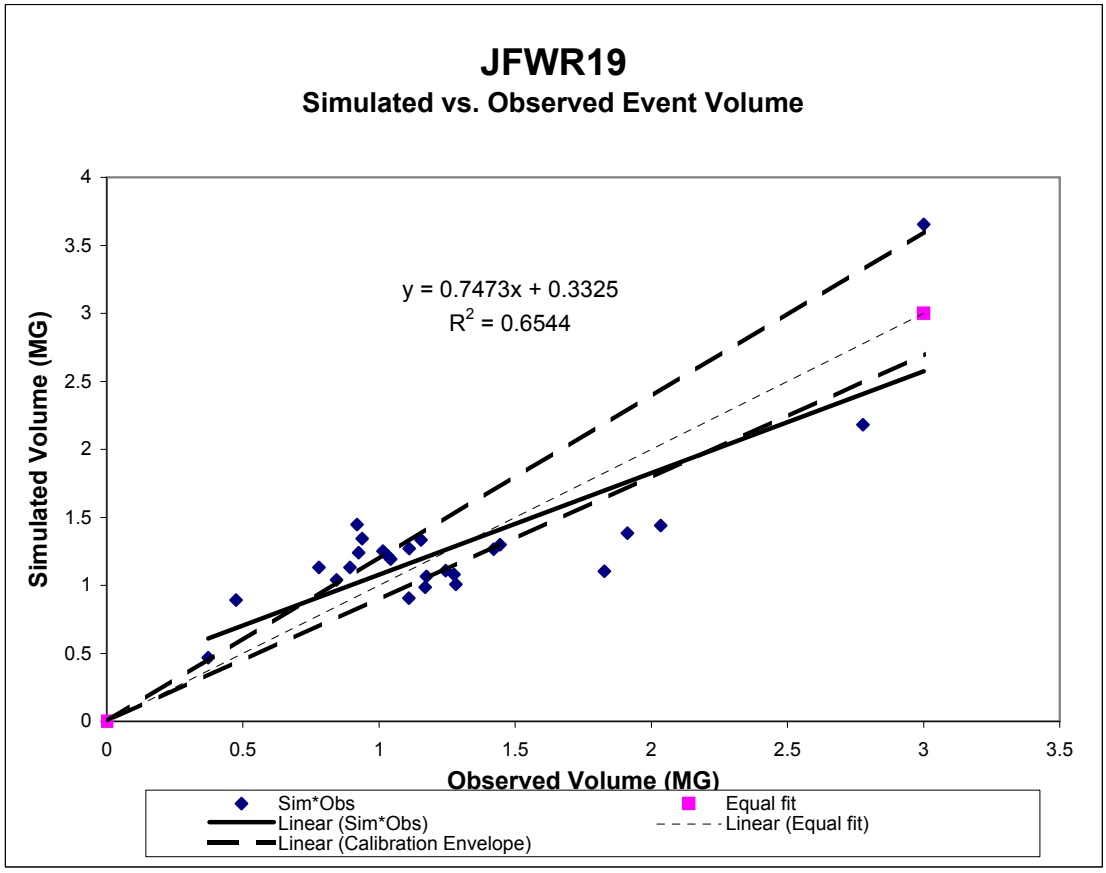

JFWR17
Simulated vs. Observed Event Peak
y = 1.1638x + 0.099
R2 = 0.3896
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
0.2
0.4
0.6
0.8
1.2
1.4
1.6
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

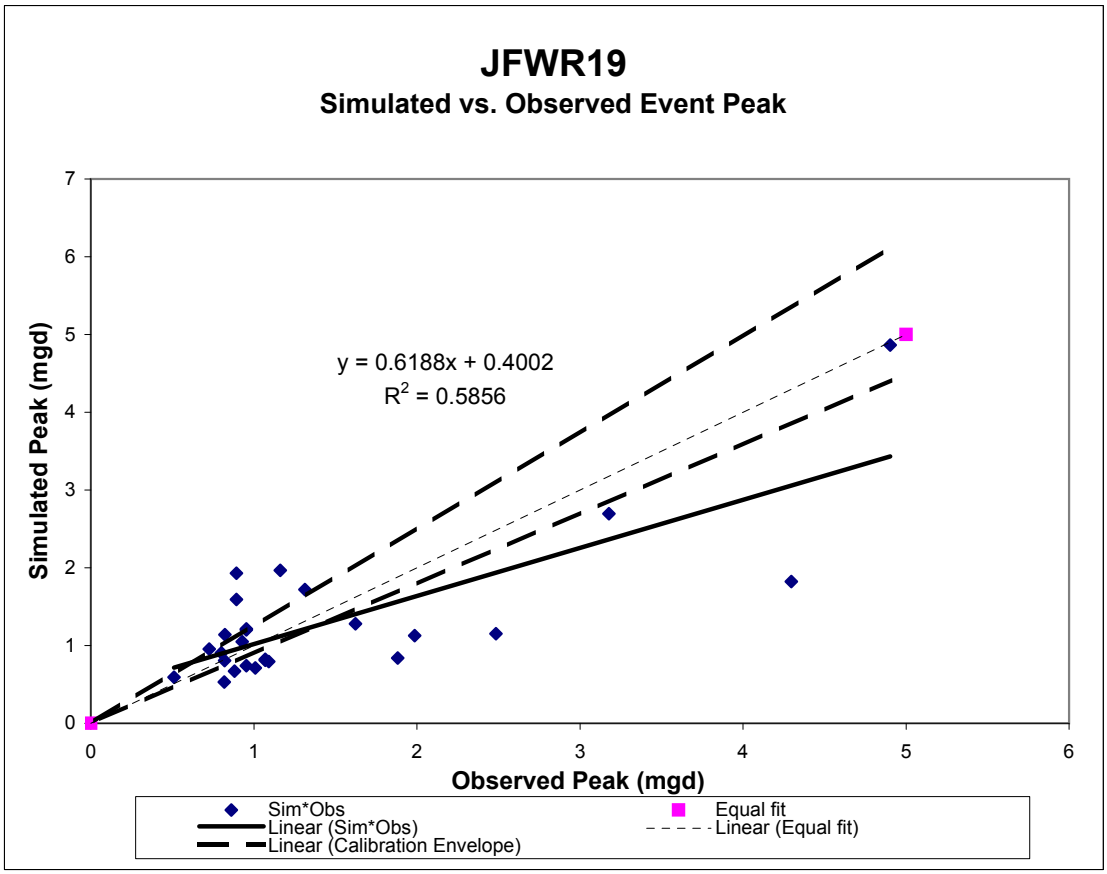
	JFWR18 15-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.231	0.343	48%	0.24	0.992	313%	0.262	0.494	0.232
June 1, 2006	0.067	0.104	55%	0.116	0.225	94%	0.175	0.234	0.059
June 2, 2006	0.095	0.28	195%	0.325	0.995	206%	0.217	0.495	0.278
June 19, 2006	0.134	0.257	92%	0.193	0.728	277%	0.201	0.421	0.220
June 25, 2006	0.563	0.777	38%	0.967	2.528	161%	9.298	7.733	-1.565
July 5, 2006	0.192	0.318	66%	0.179	0.877	390%	0.205	0.464	0.259
July 22, 2006	0.116	0.281	142%	0.263	0.940	257%	0.225	0.480	0.255
August 7, 2006	0.094	0.186	98%	0.084	0.203	142%	0.164	0.223	0.059
September 1, 2006	0.148	0.311	110%	0.381	0.363	-5%	0.224	0.297	0.073
September 5, 2006	0.145	0.262	81%	0.177	0.477	169%	0.196	0.340	0.144
September 14, 2006	0.149	0.275	85%	0.182	0.281	54%	0.2	0.262	0.062
September 28, 2006	0.130	0.227	75%	0.180	0.349	94%	0.192	0.291	0.099
October 5, 2006	0.713	0.286	-60%	0.162	0.327	102%	0.199	0.282	0.083
October 17, 2006	0.177	0.251	42%	0.222	0.412	86%	0.205	0.316	0.111
October 27, 2006	0.283	0.291	3%	0.445	0.449	1%	0.719	0.33	-0.389
November 7, 2006	0.278	0.284	2%	0.34	0.51	50%	4.121	0.352	-3.769
November 16, 2006	0.388	0.326	-16%	0.721	0.915	27%	9.183	0.474	-8.709
November 22, 2006	0.297	0.180	-39%	0.213	0.205	-4%	0.214	0.225	0.011
December 22, 2006	0.313	0.219	-30%	0.357	0.267	-25%	0.21	0.255	0.045
January 1, 2007	0.338	0.204	-40%	0.301	0.313	4%	0.202	0.276	0.074
January 7, 2007	0.39	0.211	-46%	0.371	0.23	-38%	0.227	0.237	0.010
March 1, 2007	0.488	0.219	-55%	0.549	0.292	-47%	1.026	0.267	-0.759
March 15, 2007	0.588	0.350	-40%	0.675	0.439	-35%	5.214	0.326	-4.888
April 4, 2007	0.206	0.143	-31%	0.175	0.123	-30%	0.191	0.176	-0.015
April 11, 2007	0.251	0.180	-28%	0.275	0.209	-24%	0.223	0.227	0.004
April 14, 2007	0.831	0.447	-46%	0.744	0.651	-13%	0.273	0.398	0.125


JFWR18
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3094x + 0.1869
R2 = 0.2455
0
0.2
0.4
0.6
0.8
1
1.2
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

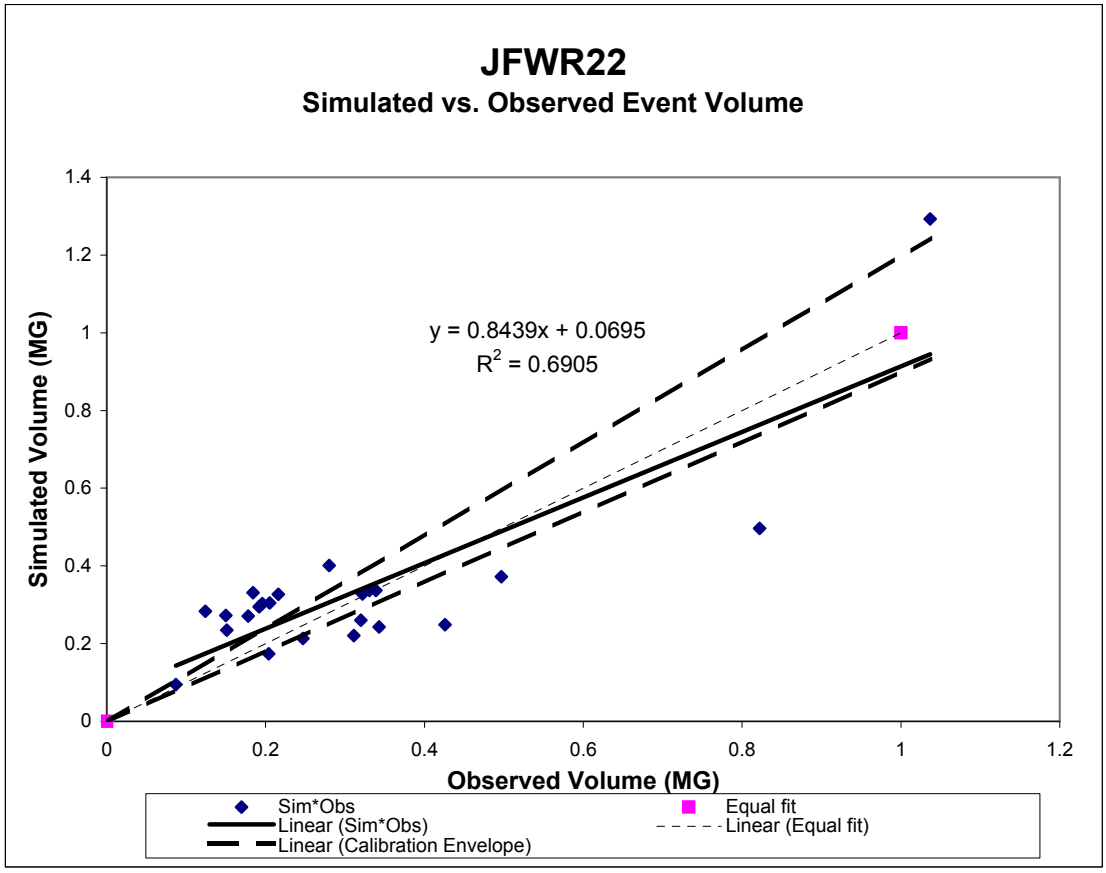

JFWR18
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 1.2973x + 0.1091
R2 = 0.3467
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

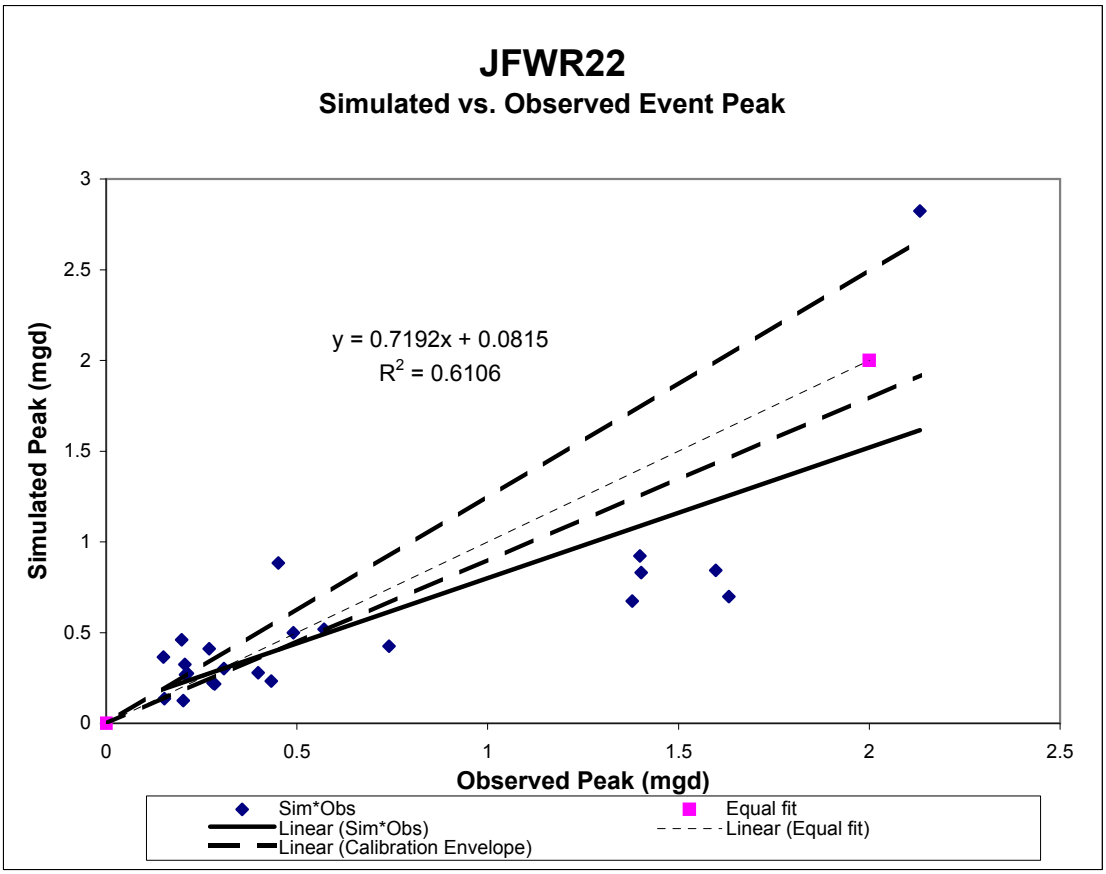
Storm Events	JFWR19 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.919	1.447	57%	1.162	1.966	69%	0.444	0.574	0.130
June 1, 2006	0.372	0.468	26%	0.510	0.594	16%	0.272	0.305	0.033
June 2, 2006	0.475	0.892	88%	0.893	1.93	116%	0.407	0.57	0.163
June 19, 2006	0.779	1.132	45%	0.953	1.215	27%	0.41	0.436	0.026
June 25, 2006	3.001	3.653	22%	4.902	4.864	-1%	9.600	10.112	0.512
July 5, 2006	1.154	1.334	16%	0.893	1.592	78%	0.366	0.506	0.140
July 22, 2006	1.014	1.252	23%	1.314	1.719	31%	0.481	0.531	0.050
August 7, 2006	0.844	1.039	23%	0.821	0.805	-2%	0.352	0.356	0.004
September 1, 2006	0.938	1.344	43%	0.823	1.141	39%	0.358	0.425	0.067
September 5, 2006	0.925	1.239	34%	0.954	1.200	26%	0.390	0.433	0.043
September 14, 2006	1.033	1.213	17%	1.069	0.811	-24%	0.439	0.356	-0.083
September 28, 2006	0.893	1.131	27%	0.727	0.955	31%	0.346	0.386	0.040
October 5, 2006	1.111	1.271	14%	0.801	0.906	13%	0.366	0.374	0.008
October 17, 2006	1.042	1.194	15%	0.928	1.048	13%	0.388	0.409	0.021
October 27, 2006	1.421	1.266	-11%	1.987	1.126	-43%	0.658	0.423	-0.235
November 7, 2006	1.444	1.298	-10%	1.623	1.281	-21%	0.544	0.448	-0.096
November 16, 2006	1.912	1.383	-28%	4.296	1.823	-58%	8.083	0.555	-7.528
November 22, 2006	1.282	1.006	-22%	1.008	0.710	-30%	0.387	0.337	-0.050
December 22, 2006	1.245	1.108	-11%	1.091	0.793	-27%	0.445	0.353	-0.092
January 1, 2007	1.174	1.067	-9%	1.069	0.823	-23%	0.421	0.358	-0.063
January 7, 2007	1.275	1.08	-15%	0.953	0.739	-22%	0.422	0.343	-0.079
March 1, 2007	1.828	1.103	-40%	1.882	0.838	-55%	0.562	0.361	-0.201
March 15, 2007	2.034	1.439	-29%	2.485	1.153	-54%	0.683	0.427	-0.256
April 4, 2007	1.109	0.907	-18%	0.818	0.532	-35%	0.315	0.291	-0.024
April 11, 2007	1.169	0.987	-16%	0.882	0.672	-24%	0.373	0.327	-0.046
April 14, 2007	2.777	2.181	-21%	3.177	2.695	-15%	0.932	0.713	-0.219


JFWR19
Simulated vs. Observed Event Volume
y = 0.7473x + 0.3325
R2 = 0.6544
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

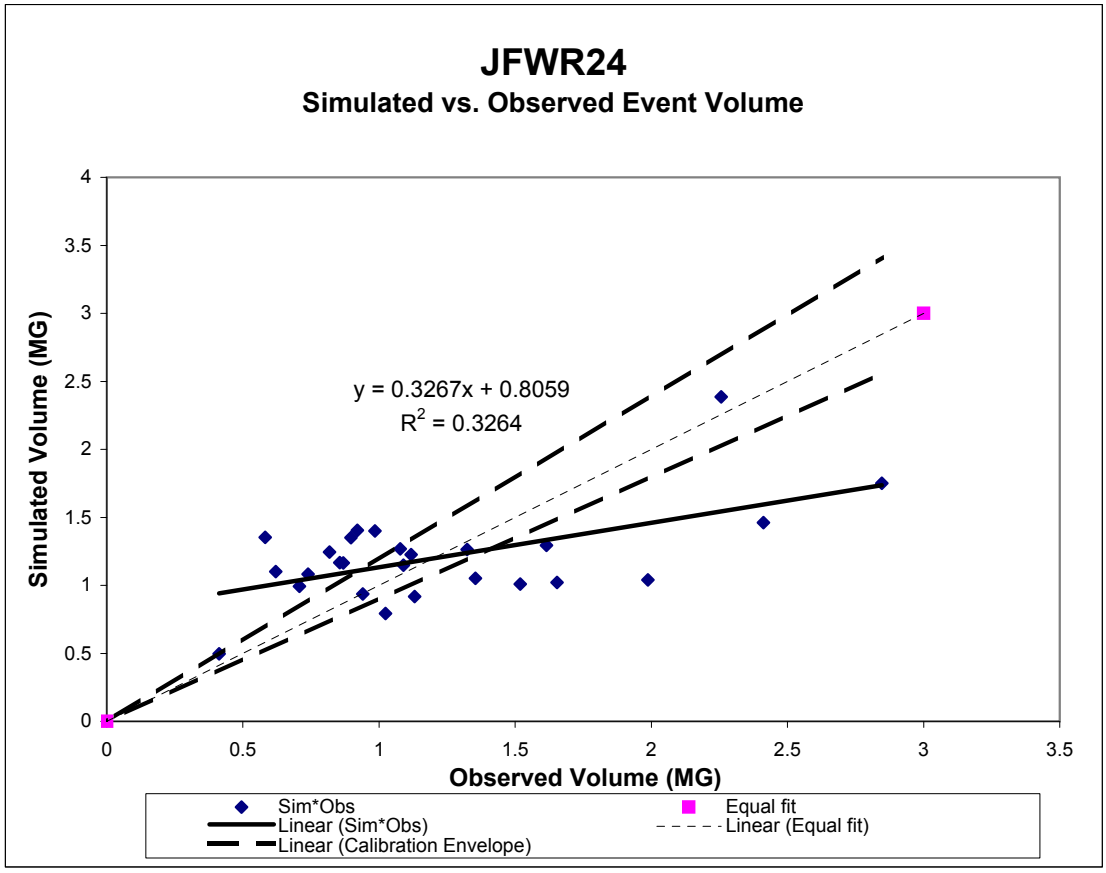

JFWR19
Simulated vs. Observed Event Peak
y = 0.6188x + 0.4002
R2 = 0.5856
Simulated Peak (mgd)
Observed Peak (mgd)
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

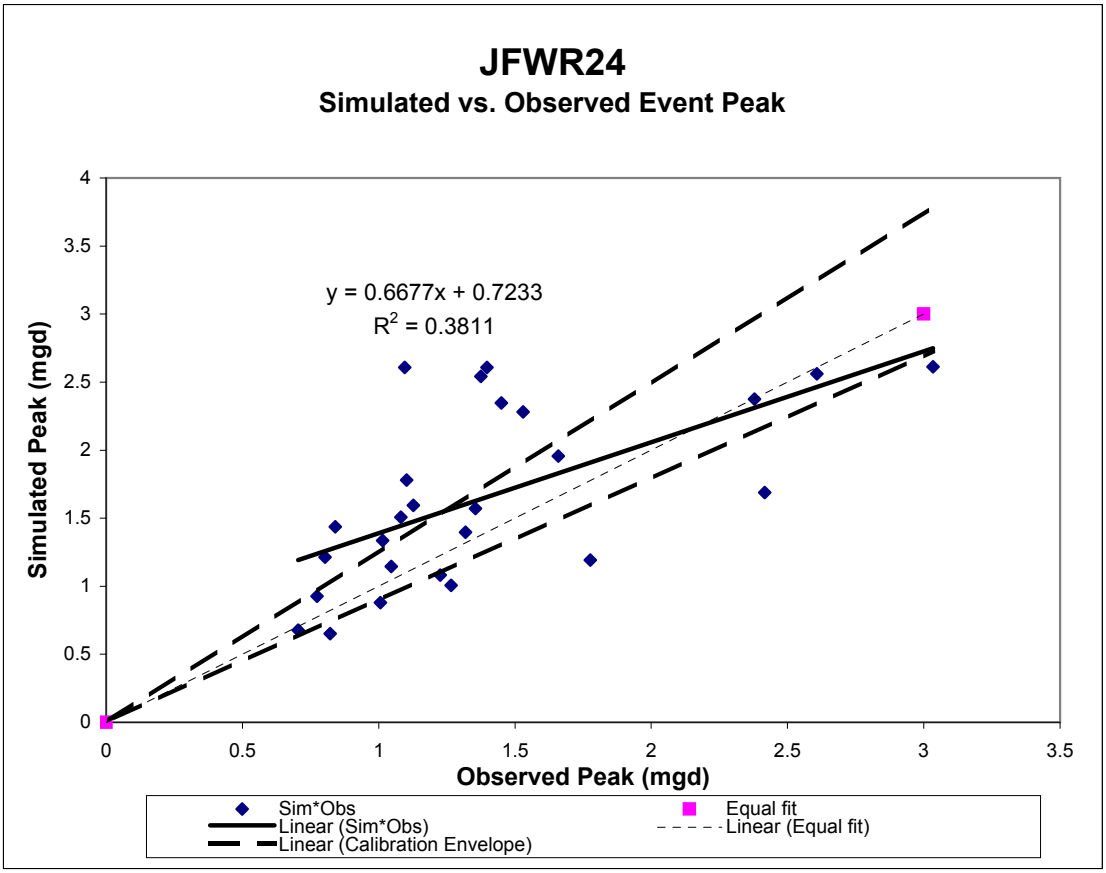
Storm Events	JFWR22 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.28	0.401	43%	1.399	0.922	-34%	0.563	0.26	-0.303
June 1, 2006	0.087	0.095	9%	0.153	0.135	-12%	0.118	0.124	0.006
June 2, 2006	0.124	0.283	128%	0.451	0.883	96%	0.218	0.253	0.035
June 19, 2006	0.178	0.271	52%	0.491	0.499	2%	0.238	0.197	-0.041
June 25, 2006	1.037	1.293	25%	2.133	2.824	32%	1.145	8.665	7.520
July 5, 2006	0.331	0.337	2%	1.632	0.699	-57%	0.629	0.230	-0.399
July 22, 2006	0.216	0.327	51%	1.402	0.831	-41%	0.617	0.246	-0.371
August 7, 2006	0.151	0.235	56%	0.208	0.268	29%	0.148	0.157	0.009
September 1, 2006									
September 5, 2006	0.205	0.305	49%	0.198	0.460	132%	0.145	0.190	0.045
September 14, 2006	0.196	0.303	55%	0.213	0.276	30%	0.14	0.159	0.019
September 28, 2006	0.150	0.273	82%	0.150	0.365	143%	0.116	0.175	0.059
October 5, 2006	0.184	0.331	80%	0.206	0.325	58%	0.136	0.168	0.032
October 17, 2006	0.192	0.295	54%	0.27	0.411	52%	0.155	0.182	0.027
October 27, 2006	0.322	0.328	2%	0.741	0.425	-43%	0.279	0.184	-0.095
November 7, 2006	0.339	0.337	-1%	0.571	0.518	-9%	0.237	0.2	-0.037
November 16, 2006	0.497	0.372	-25%	1.598	0.843	-47%	0.506	0.247	-0.259
November 22, 2006	0.311	0.221	-29%	0.280	0.223	-20%	0.170	0.146	-0.024
December 22, 2006	0.32	0.26	-19%	0.398	0.278	-30%	0.196	0.159	-0.037
January 1, 2007	0.343	0.243	-29%	0.309	0.302	-2%	0.185	0.164	-0.021
January 7, 2007	0.426	0.249	-42%	0.433	0.232	-46%	0.224	0.148	-0.076
March 1, 2007									
March 15, 2007									
April 4, 2007	0.204	0.174	-15%	0.202	0.126	-38%	0.140	0.122	-0.018
April 11, 2007	0.247	0.213	-14%	0.284	0.217	-24%	0.163	0.144	-0.019
April 14, 2007	0.822	0.497	-40%	1.379	0.674	-51%	0.417	0.227	-0.190


JFWR22
Simulated vs. Observed Event Volume
y = 0.8439x + 0.0695
R2 = 0.6905
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

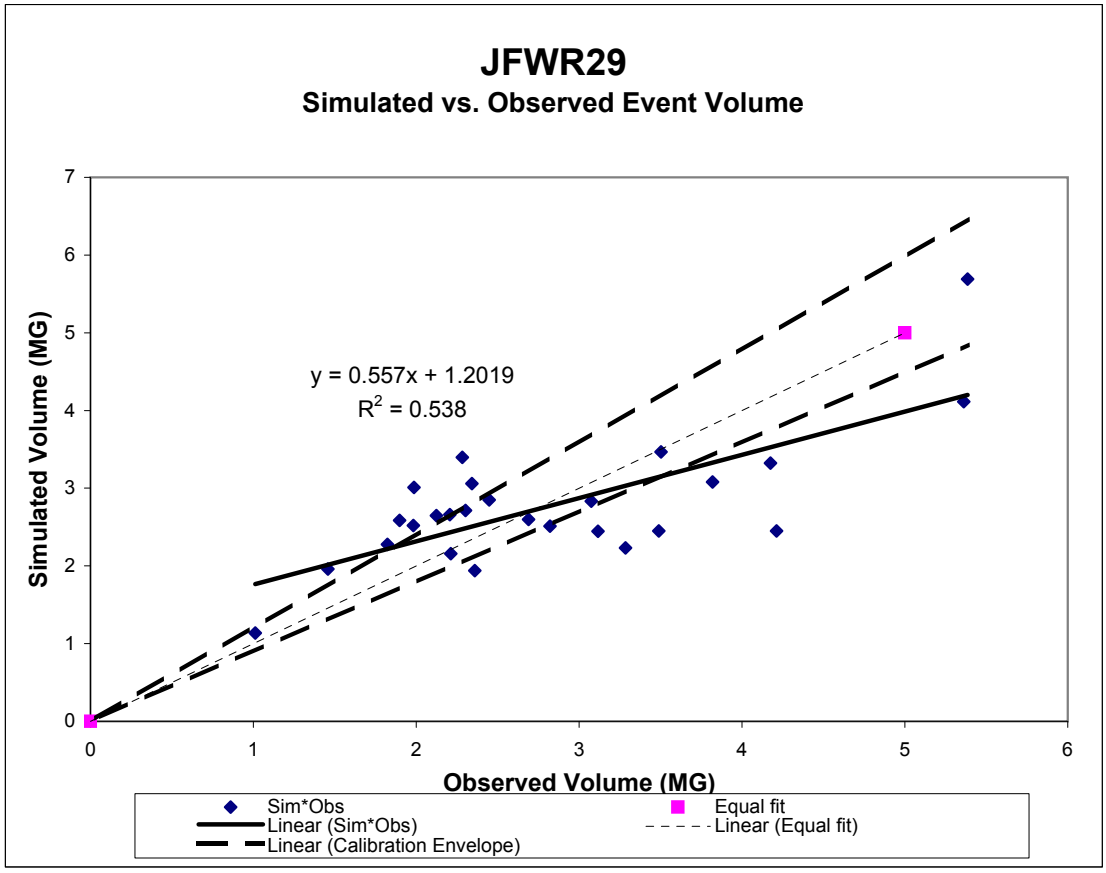

JFWR22
Simulated vs. Observed Event Peak
y = 0.7192x + 0.0815
R2 = 0.6106
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

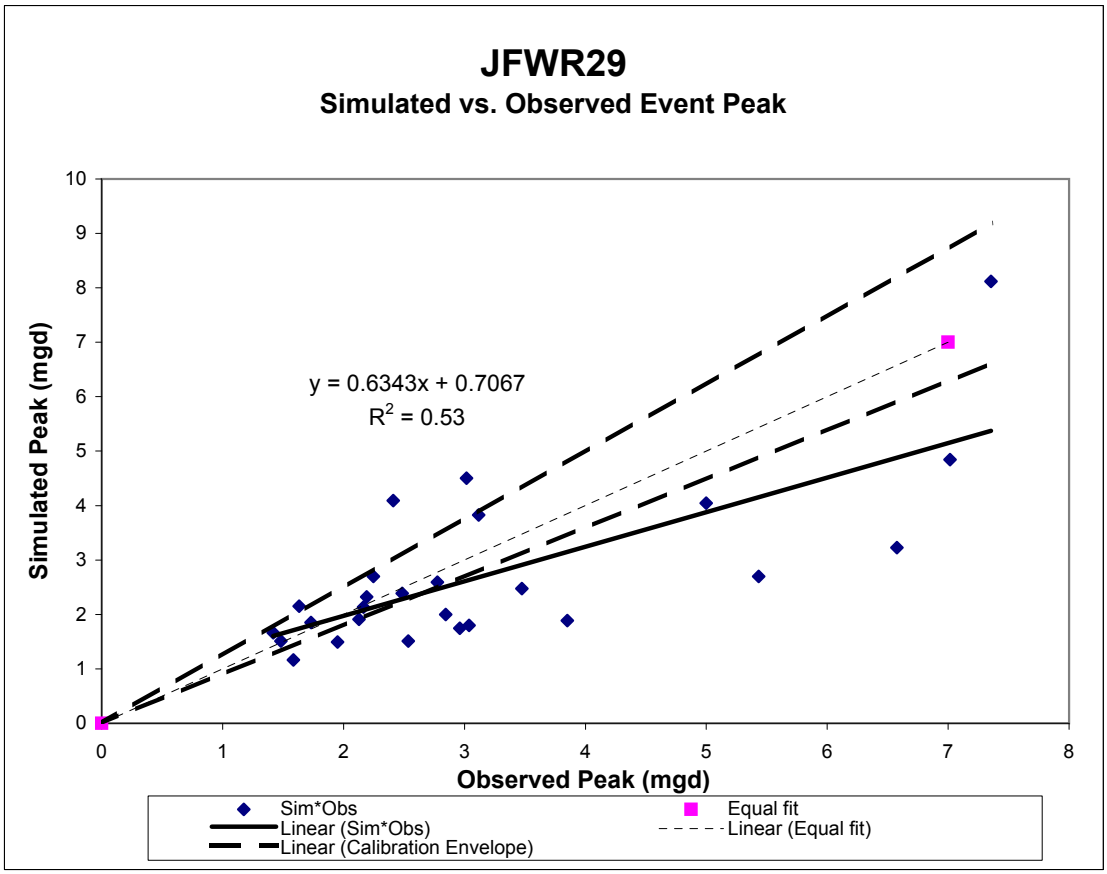
Storm Events	JFWR24 12-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.985	1.399	42%	1.397	2.609	87%	0.699	1.791	1.092
June 1, 2006	0.412	0.497	21%	0.704	0.677	-4%	0.407	0.401	-0.006
June 2, 2006	0.920	1.405	53%	1.375	2.541	85%	0.666	1.657	0.991
June 19, 2006	0.621	1.100	77%	1.530	2.282	49%	0.717	1.107	0.390
June 25, 2006	2.256	2.387	6%	3.034	2.613	-14%	1.381	3.021	1.640
July 5, 2006	1.118	1.225	10%	1.450	2.348	62%	0.622	1.252	0.630
July 22, 2006	0.818	1.244	52%	1.096	2.608	138%	0.517	1.790	1.273
August 7, 2006	0.708	0.992	40%	1.046	1.145	9%	0.512	0.536	0.024
September 1, 2006	0.897	1.350	51%	1.081	1.507	39%	0.482	0.639	0.157
September 5, 2006	0.868	1.164	34%	1.103	1.781	61%	0.523	0.715	0.192
September 14, 2006	0.856	1.168	36%	0.803	1.213	51%	0.438	0.559	0.121
September 28, 2006	0.739	1.082	46%	0.841	1.437	71%	0.451	0.623	0.172
October 5, 2006	1.078	1.269	18%	1.014	1.335	32%	0.469	0.584	0.115
October 17, 2006	1.089	1.149	6%	1.127	1.595	42%	0.494	0.657	0.163
October 27, 2006	1.323	1.263	-5%	1.355	1.572	16%	0.632	0.651	0.019
November 7, 2006	1.615	1.295	-20%	1.659	1.957	18%	0.758	0.750	-0.008
November 16, 2006	0.582	1.353	132%	2.608	2.562	-2%	1.132	1.698	0.566
November 22, 2006	0.940	0.937	0%	0.774	0.927	20%	0.583	0.477	-0.106
December 22, 2006	1.354	1.052	-22%	1.226	1.081	-12%	0.530	0.514	-0.016
January 1, 2007	1.519	1.010	-34%	1.319	1.398	6%	0.577	0.607	0.030
January 7, 2007	1.654	1.022	-38%	1.266	1.006	-21%	0.549	0.497	-0.052
March 1, 2007	1.987	1.041	-48%	1.777	1.192	-33%	0.685	0.553	-0.132
March 15, 2007	2.412	1.462	-39%	2.416	1.689	-30%	0.878	0.697	-0.181
April 4, 2007	1.024	0.793	-23%	0.822	0.651	-21%	0.397	0.391	-0.006
April 11, 2007	1.131	0.917	-19%	1.006	0.879	-13%	0.464	0.459	-0.005
April 14, 2007	2.846	1.750	-39%	2.379	2.376	0%	0.864	1.314	0.450


JFWR24
Simulated vs. Observed Event Volume
y = 0.3267x + 0.8059
R2 = 0.3264
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

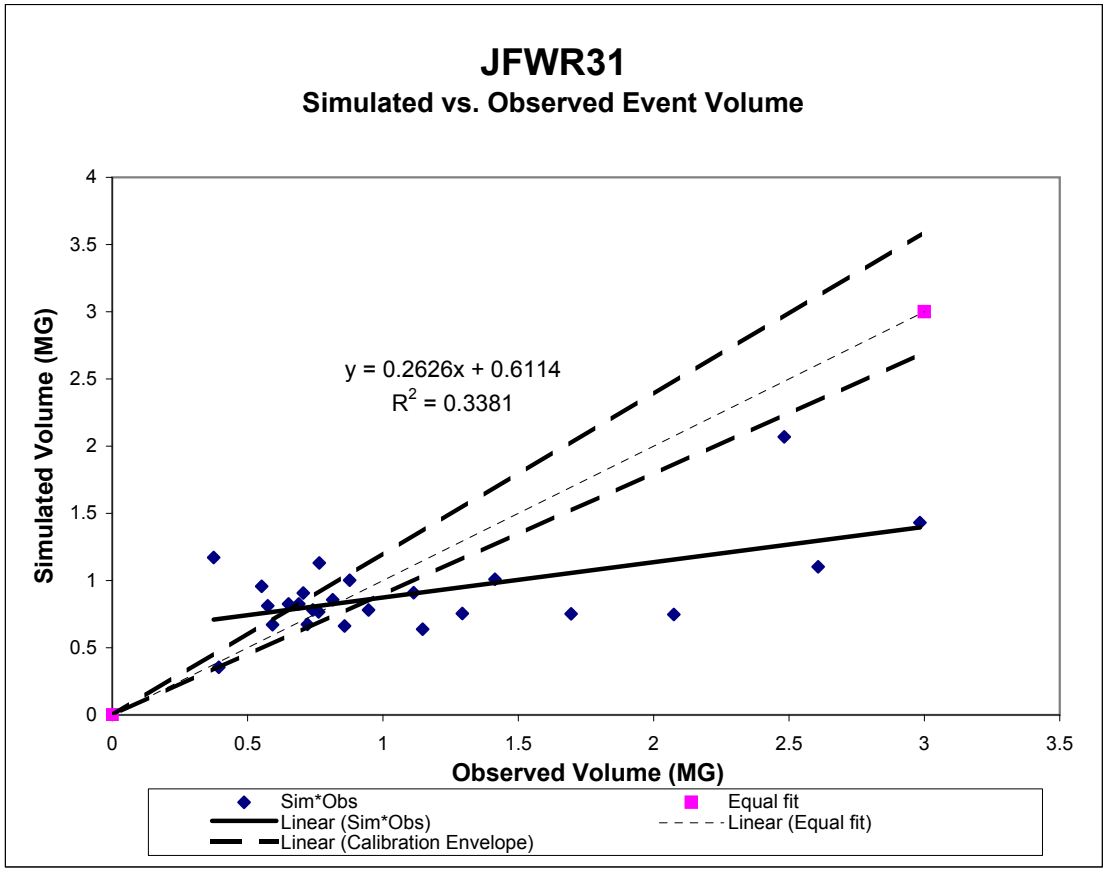

JFWR24
Simulated vs. Observed Event Peak
y = 0.6677x + 0.7233
R2 = 0.3811
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

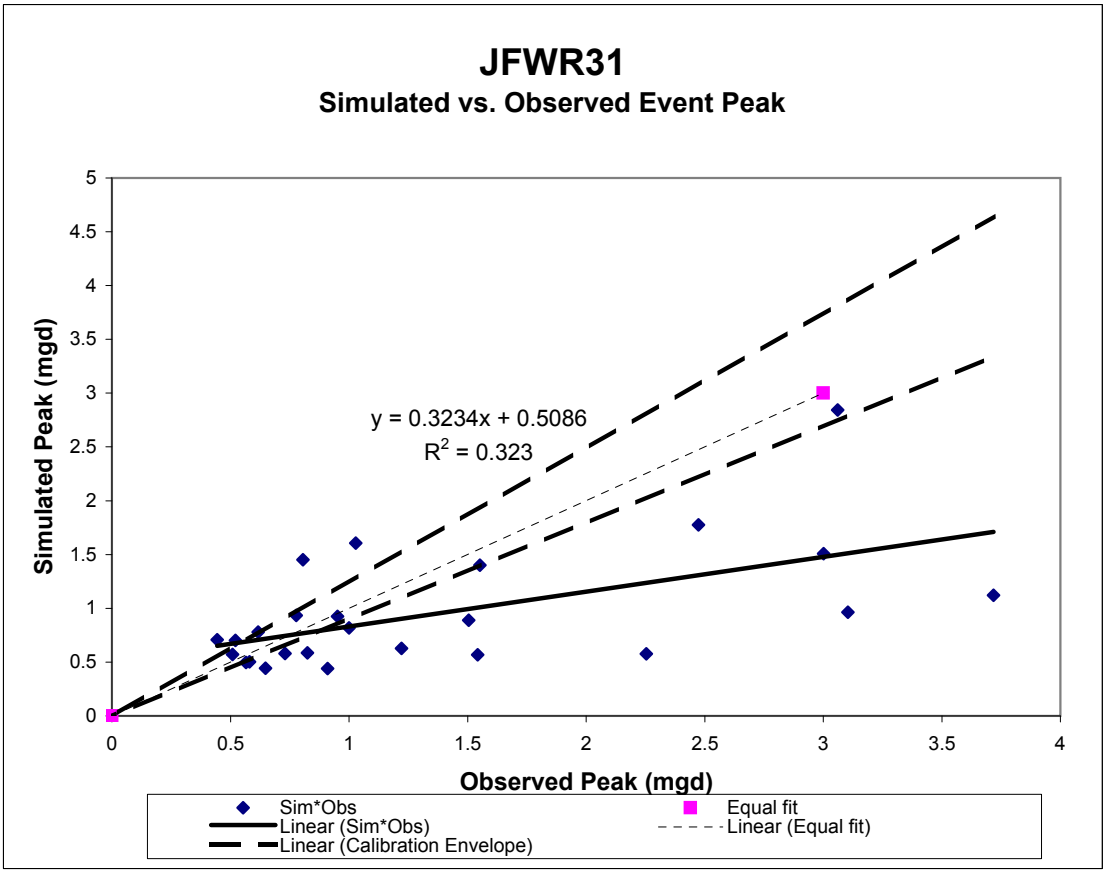
Storm Events	JFWR29 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	2.283	3.398	49%	3.018	4.501	49%	0.705	0.939	0.234
June 1, 2006	1.011	1.136	12%	1.481	1.511	2%	0.467	0.481	0.014
June 2, 2006	1.457	1.96	35%	3.117	3.829	23%	0.744	0.843	0.099
June 19, 2006	1.982	2.522	27%	2.775	2.595	-6%	0.693	0.658	-0.035
June 25, 2006	5.386	5.689	6%	7.354	8.121	10%	1.550	1.452	-0.098
July 5, 2006	2.689	2.600	-3%	2.129	1.912	-10%	0.619	0.554	-0.065
July 22, 2006	1.986	3.010	52%	2.411	4.093	70%	0.643	0.887	0.244
August 7, 2006	1.824	2.279	25%	1.418	1.665	17%	0.466	0.508	0.042
September 1, 2006	2.342	3.058	31%	2.247	2.696	20%	0.611	0.670	0.059
September 5, 2006	2.123	2.647	25%	2.190	2.323	6%	0.617	0.615	-0.002
September 14, 2006	2.206	2.66	21%	1.732	1.854	7%	0.512	0.541	0.029
September 28, 2006	1.897	2.586	36%	1.634	2.153	32%	0.518	0.590	0.072
October 5, 2006	2.447	2.850	16%	2.164	2.135	-1%	0.612	0.587	-0.025
October 17, 2006	2.302	2.712	18%	2.485	2.384	-4%	0.659	0.623	-0.036
October 27, 2006	3.074	2.835	-8%	3.476	2.473	-29%	0.8	0.637	-0.163
November 7, 2006	3.82	3.082	-19%	6.575	3.23	-51%	1.294	0.75	-0.544
November 16, 2006	3.503	3.469	-1%	7.016	4.846	-31%	1.295	0.984	-0.311
November 22, 2006	3.284	2.232	-32%	2.535	1.508	-41%	0.684	0.481	-0.203
December 22, 2006	2.822	2.511	-11%	3.039	1.797	-41%	0.708	0.531	-0.177
January 1, 2007	3.116	2.444	-22%	2.845	1.999	-30%	0.727	0.566	-0.161
January 7, 2007	3.489	2.448	-30%	2.962	1.747	-41%	0.72	0.521	-0.199
March 1, 2007	4.213	2.449	-42%	3.851	1.885	-51%	0.865	0.546	-0.319
March 15, 2007	4.174	3.324	-20%	5.433	2.698	-50%	1.065	0.670	-0.395
April 4, 2007	2.359	1.939	-18%	1.586	1.163	-27%	0.485	0.418	-0.067
April 11, 2007	2.213	2.159	-2%	1.950	1.494	-23%	0.559	0.478	-0.081
April 14, 2007	5.361	4.112	-23%	5	4.046	-19%	1.300	0.873	-0.427


JFWR29
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.557x + 1.2019
R2 = 0.538
0
1
2
3
4
5
6
7
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

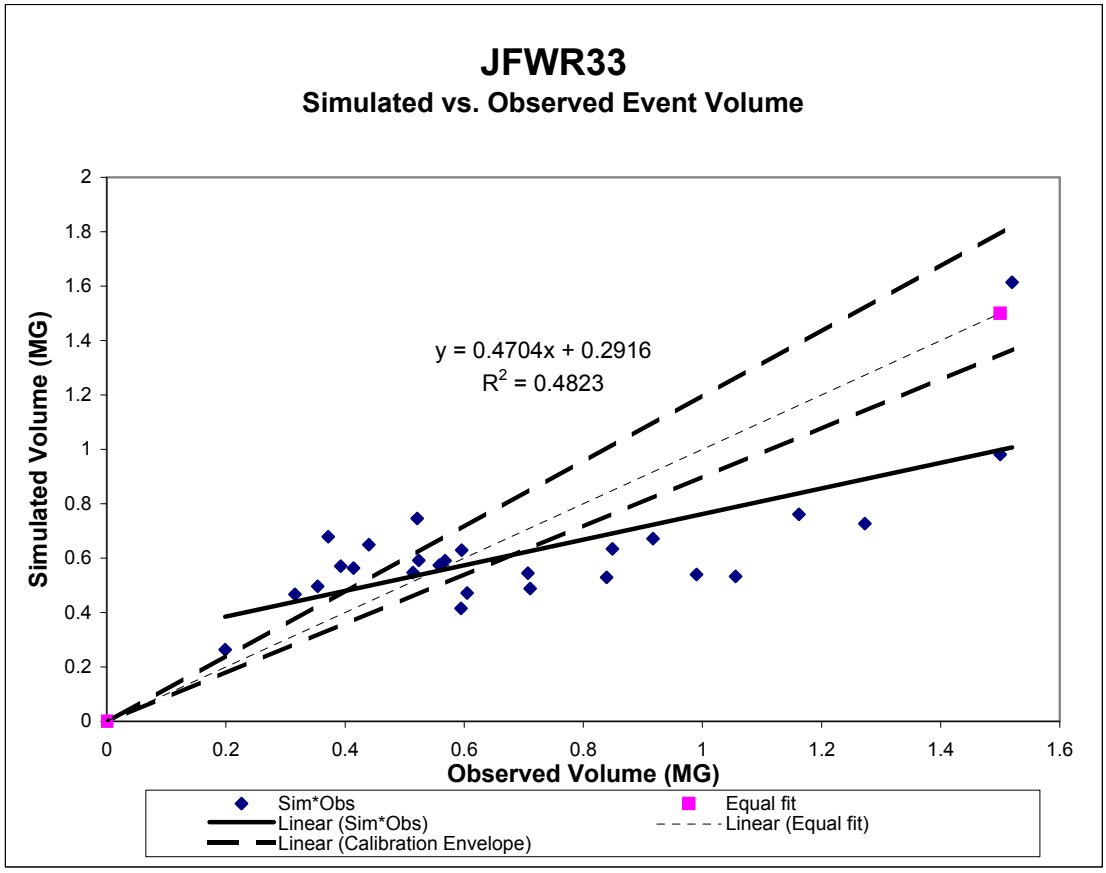

JFWR29
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.6343x + 0.7067
R2 = 0.53
0
1
2
3
4
5
6
7
8
9
10
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

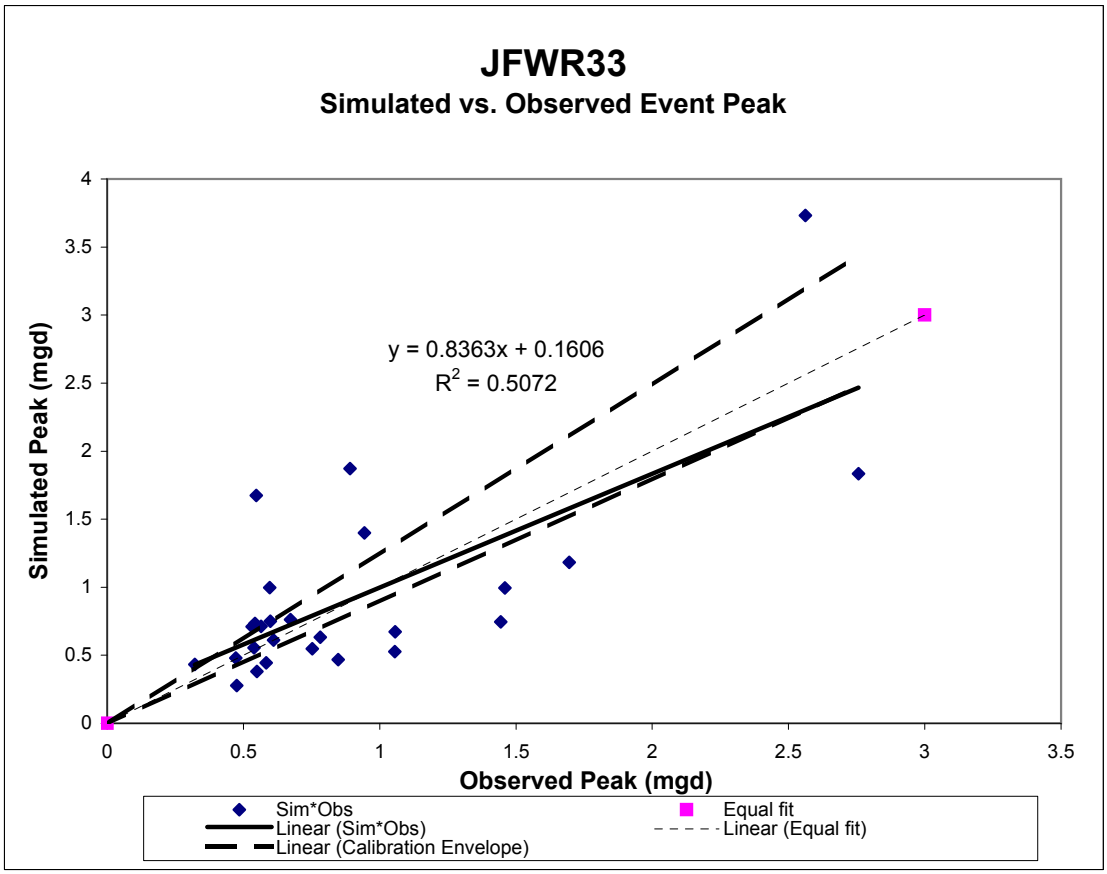
Storm Events	JFWR31 18-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.765	1.13	48%	1.029	1.607	56%	1.163	1.601	0.438
June 1, 2006	0.394	0.354	-10%	0.580	0.504	-13%	0.999	0.949	-0.050
June 2, 2006	0.592	0.671	13%	1.552	1.402	-10%	1.257	1.483	0.226
June 19, 2006	0.763	0.767	1%	0.951	0.924	-3%	1.1	1.208	0.108
June 25, 2006	2.482	2.069	-17%	3.061	2.845	-7%	1.559	2.325	0.766
July 5, 2006	0.947	0.782	-17%	0.824	0.585	-29%	1.037	1.002	-0.035
July 22, 2006	0.552	0.956	73%	0.805	1.452	80%	1.135	1.512	0.377
August 7, 2006	0.721	0.673	-7%	0.565	0.496	-12%	0.978	0.943	-0.035
September 1, 2006	0.877	1.003	14%	0.777	0.934	20%	1.089	1.215	0.126
September 5, 2006	0.651	0.826	27%	0.617	0.779	26%	1.103	1.123	0.020
September 14, 2006	0.689	0.827	20%	0.509	0.57	12%	1.006	0.992	-0.014
September 28, 2006	0.574	0.811	41%	0.444	0.707	59%	0.999	1.078	0.079
October 5, 2006	0.706	0.907	28%	0.521	0.701	35%	1.069	1.074	0.005
October 17, 2006	0.814	0.857	5%	1	0.818	-18%	1.12	1.146	0.026
October 27, 2006	1.113	0.91	-18%	1.505	0.89	-41%	1.267	1.189	-0.078
November 7, 2006	1.414	1.01	-29%	3.718	1.122	-70%	1.447	1.324	-0.123
November 16, 2006	0.375	1.171	212%	2.474	1.776	-28%	1.482	1.698	0.216
November 22, 2006	0.858	0.661	-23%	0.648	0.444	-31%	1.096	0.907	-0.189
December 22, 2006	0.741	0.782	6%	0.73	0.581	-20%	1.152	0.999	-0.153
January 1, 2007	1.293	0.755	-42%	1.221	0.629	-48%	1.16	1.03	-0.130
January 7, 2007	1.695	0.753	-56%	1.542	0.567	-63%	1.177	0.99	-0.187
March 1, 2007	2.074	0.747	-64%	2.254	0.578	-74%	1.306	0.997	-0.309
March 15, 2007	2.607	1.102	-58%	3.104	0.964	-69%	1.392	1.233	-0.159
April 4, 2007									
April 11, 2007	1.147	0.638	-44%	0.909	0.439	-52%	1.004	0.904	-0.100
April 14, 2007	2.983	1.431	-52%	3.001	1.507	-50%	1.418	1.544	0.126


JFWR31
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.2626x + 0.6114
R2 = 0.3381
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

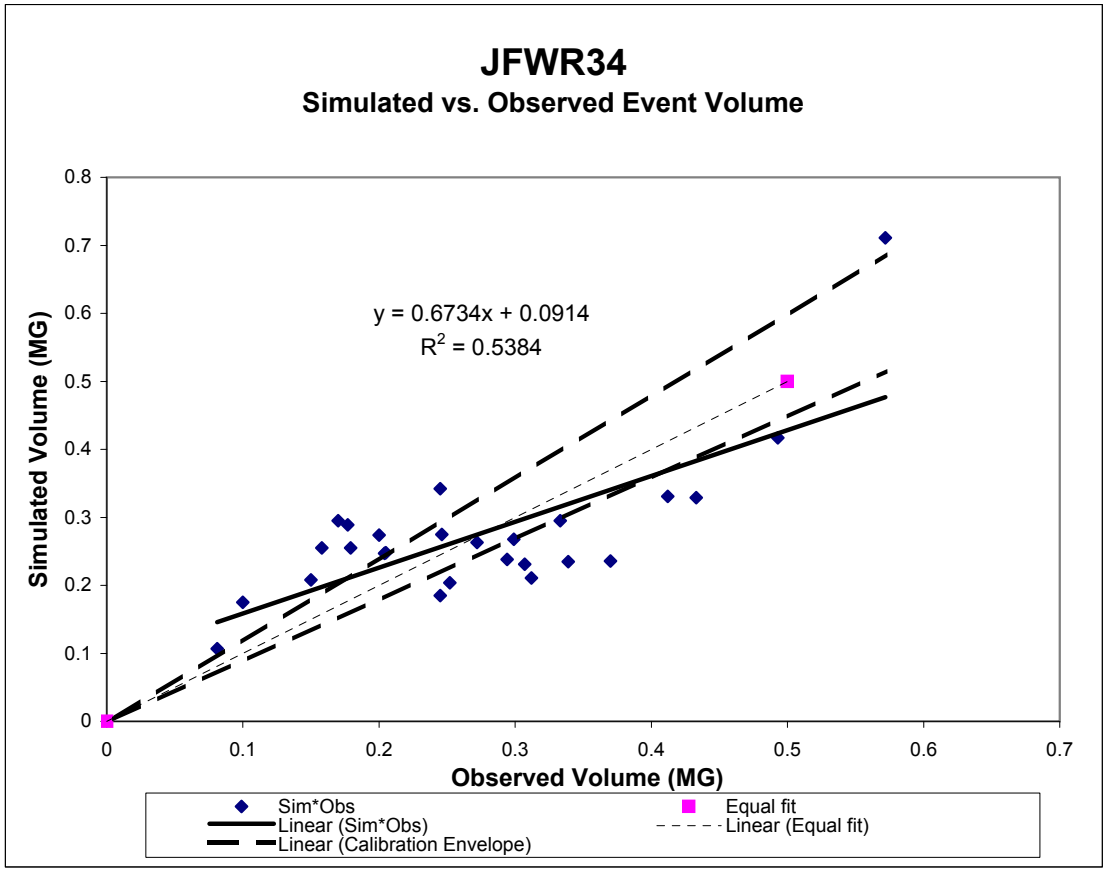

JFWR31
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.3234x + 0.5086
R2 = 0.323
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

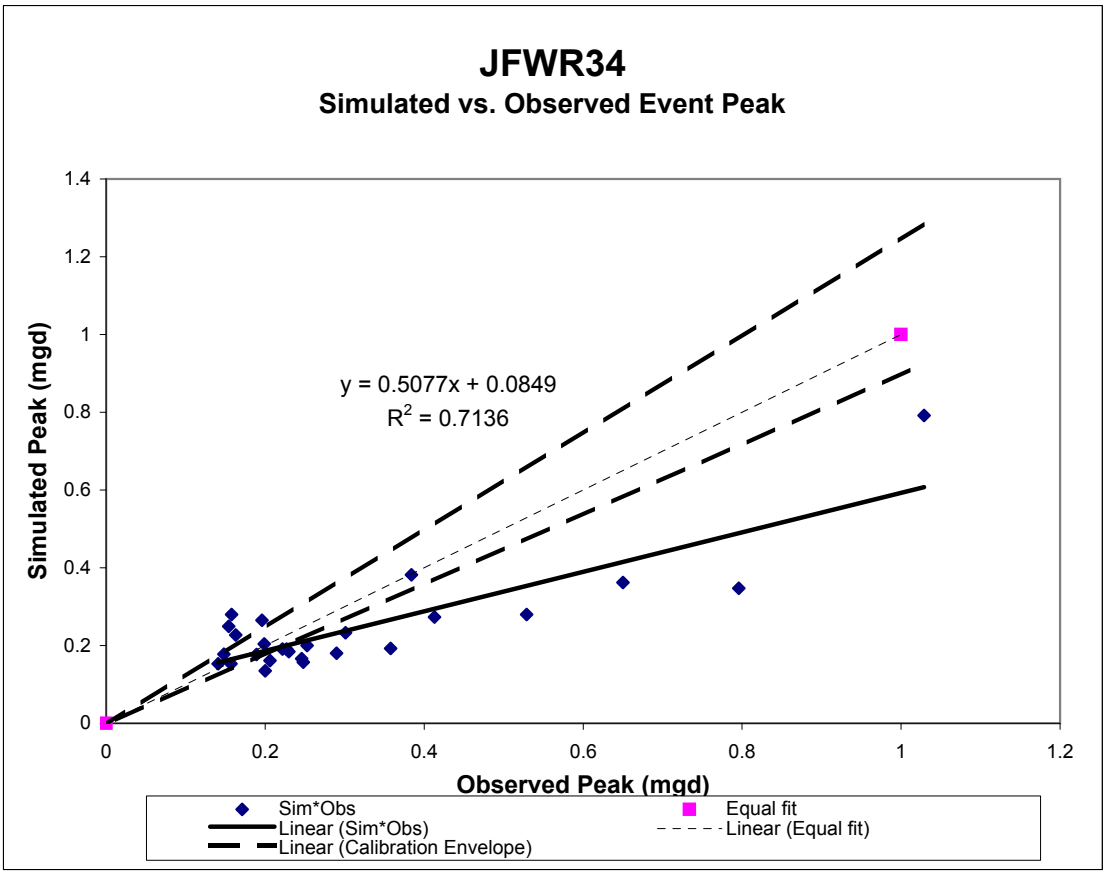
Storm Events	JFWR33 15-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.521	0.746	43%	0.891	1.872	110%	0.451	0.687	0.236
June 1, 2006	0.199	0.263	32%	0.472	0.479	1%	0.345	0.342	-0.003
June 2, 2006	0.316	0.467	48%	0.944	1.399	48%	0.503	0.59	0.087
June 19, 2006	0.514	0.547	6%	0.596	0.996	67%	0.365	0.496	0.131
June 25, 2006	1.520	1.614	6%	2.562	3.731	46%	0.771	1.530	0.759
July 5, 2006	0.558	0.574	3%	0.599	0.750	25%	0.412	0.429	0.017
July 22, 2006	0.440	0.650	48%	0.547	1.675	206%	0.337	0.648	0.311
August 7, 2006	0.354	0.496	40%	0.322	0.432	34%	0.287	0.325	0.038
September 1, 2006	0.372	0.679	83%	0.532	0.709	33%	0.399	0.416	0.017
September 5, 2006	0.393	0.571	45%	0.542	0.734	35%	0.393	0.424	0.031
September 14, 2006	0.524	0.592	13%	0.539	0.555	3%	0.378	0.368	-0.010
September 28, 2006	0.414	0.563	36%	0.565	0.712	26%	0.395	0.418	0.023
October 5, 2006	0.596	0.630	6%	0.611	0.612	0%	0.384	0.387	0.003
October 17, 2006	0.568	0.591	4%	0.673	0.763	13%	0.372	0.432	0.060
October 27, 2006	0.849	0.634	-25%	1.057	0.673	-36%	0.536	0.406	-0.130
November 7, 2006	0.917	0.672	-27%	1.459	0.995	-32%	0.562	0.495	-0.067
November 16, 2006	1.162	0.761	-35%	2.757	1.834	-33%	0.815	0.679	-0.136
November 22, 2006	0.711	0.488	-31%	0.584	0.444	-24%	0.414	0.329	-0.085
December 22, 2006	0.707	0.545	-23%	0.753	0.547	-27%	0.417	0.365	-0.052
January 1, 2007	0.839	0.53	-37%	0.782	0.632	-19%	0.424	0.393	-0.031
January 7, 2007	0.99	0.54	-45%	0.848	0.467	-45%	0.432	0.338	-0.094
March 1, 2007	1.056	0.533	-50%	1.056	0.527	-50%	0.471	0.359	-0.112
March 15, 2007	1.273	0.727	-43%	1.444	0.745	-48%	0.559	0.427	-0.132
April 4, 2007	0.595	0.415	-30%	0.476	0.277	-42%	0.352	0.261	-0.091
April 11, 2007	0.605	0.472	-22%	0.549	0.381	-31%	0.396	0.305	-0.091
April 14, 2007	1.5	0.981	-35%	1.695	1.184	-30%	0.595	0.542	-0.053


JFWR33
Simulated vs. Observed Event Volume
y = 0.4704x + 0.2916
R2 = 0.4823
Simulated Volume (MG)
Observed Volume (MG)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

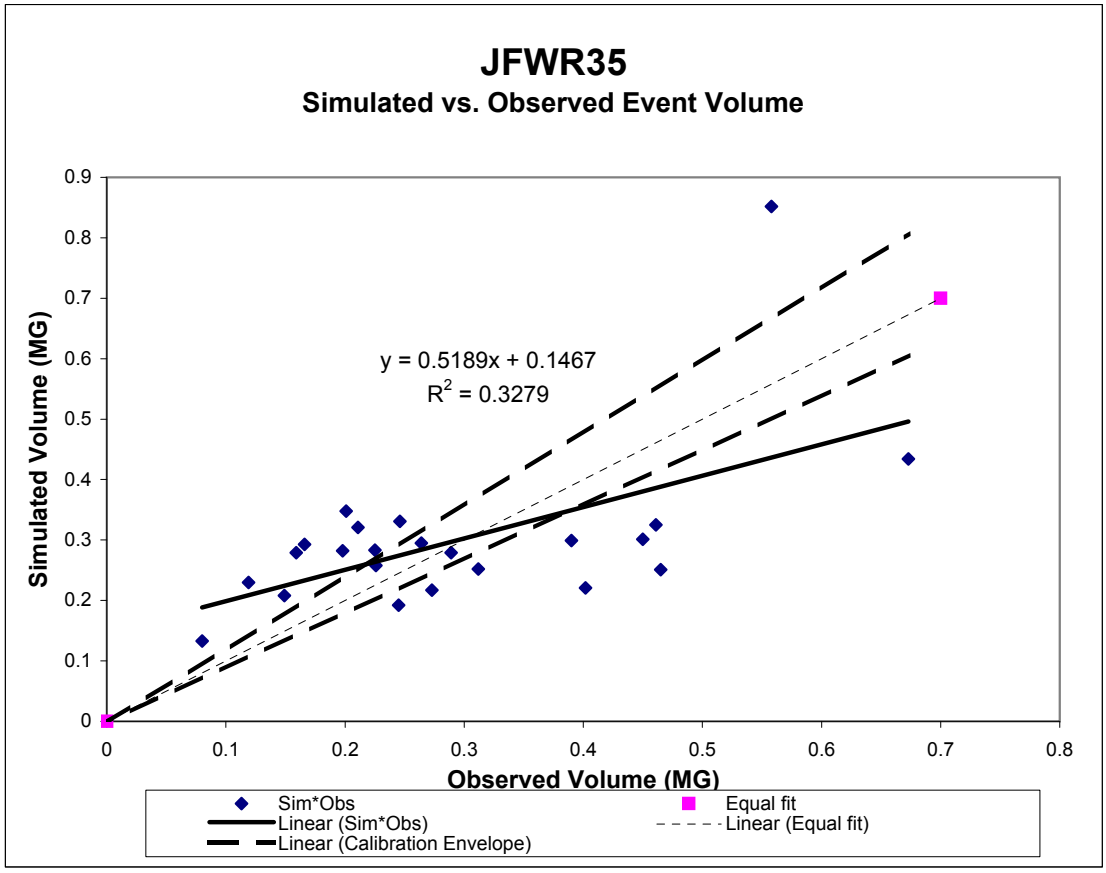

JFWR33
Simulated vs. Observed Event Peak
y = 0.8363x + 0.1606
R2 = 0.5072
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)
Linear (Calibration Envelope)

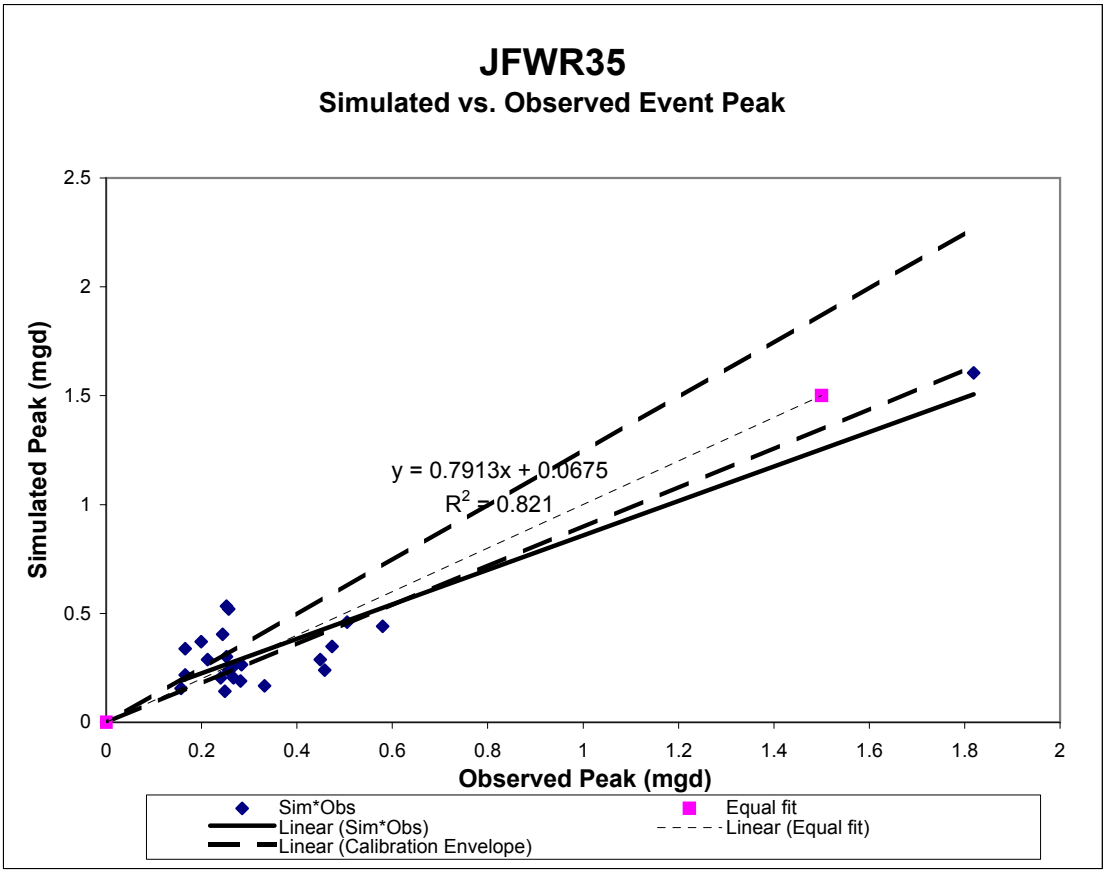
Storm Events	JFWR34 10-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.245	0.342	40%	0.384	0.382	-1%	0.602	0.55	-0.052
June 1, 2006	0.081	0.107	32%	0.157	0.153	-3%	0.576	0.338	-0.238
June 2, 2006	0.1	0.175	75%	0.158	0.28	77%	0.623	0.446	-0.177
June 19, 2006	0.204	0.247	21%	0.222	0.191	-14%	0.625	0.371	-0.254
June 25, 2006	0.572	0.711	24%	1.029	0.792	-23%	0.939	2.745	1.806
July 5, 2006	0.200	0.274	37%	0.163	0.227	39%	0.324	0.399	0.075
July 22, 2006	0.170	0.295	74%	0.196	0.265	35%	0.320	0.432	0.112
August 7, 2006	0.15	0.208	39%	0.141	0.153	9%	0.301	0.338	0.037
September 1, 2006	0.177	0.289	63%	0.154	0.249	62%	0.331	0.422	0.091
September 5, 2006	0.158	0.255	61%	0.148	0.178	20%	0.322	0.356	0.034
September 14, 2006	0.179	0.255	42%	0.189	0.177	-6%	0.365	0.355	-0.010
September 28, 2006	0.205	0.248	21%	0.227	0.191	-16%	0.409	0.371	-0.038
October 5, 2006	0.246	0.275	12%	0.199	0.204	3%	0.377	0.382	0.005
October 17, 2006	0.272	0.263	-3%	0.253	0.2	-21%	0.389	0.379	-0.010
October 27, 2006	0.299	0.268	-10%	0.301	0.233	-23%	0.432	0.405	-0.027
November 7, 2006	0.333	0.295	-11%	0.529	0.28	-47%	0.537	0.446	-0.091
November 16, 2006	0.433	0.329	-24%	0.796	0.347	-56%	0.722	0.510	-0.212
November 22, 2006	0.312	0.211	-32%	0.248	0.157	-37%	0.398	0.341	-0.057
December 22, 2006	0.294	0.238	-19%	0.246	0.166	-33%	0.4	0.347	-0.053
January 1, 2007	0.307	0.231	-25%	0.23	0.184	-20%	0.388	0.363	-0.025
January 7, 2007	0.339	0.235	-31%	0.29	0.18	-38%	0.423	0.359	-0.064
March 1, 2007	0.370	0.236	-36%	0.358	0.193	-46%	0.468	0.373	-0.095
March 15, 2007	0.412	0.331	-20%	0.413	0.273	-34%	0.513	0.438	-0.075
April 4, 2007	0.245	0.185	-24%	0.200	0.135	-33%	0.352	0.320	-0.032
April 11, 2007	0.252	0.204	-19%	0.206	0.161	-22%	0.402	0.344	-0.058
April 14, 2007	0.493	0.417	-15%	0.65	0.362	-44%	0.704	0.522	-0.182


JFWR34
Simulated vs. Observed Event Volume
y = 0.6734x + 0.0914
R2 = 0.5384
Simulated Volume (MG)
Observed Volume (MG)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

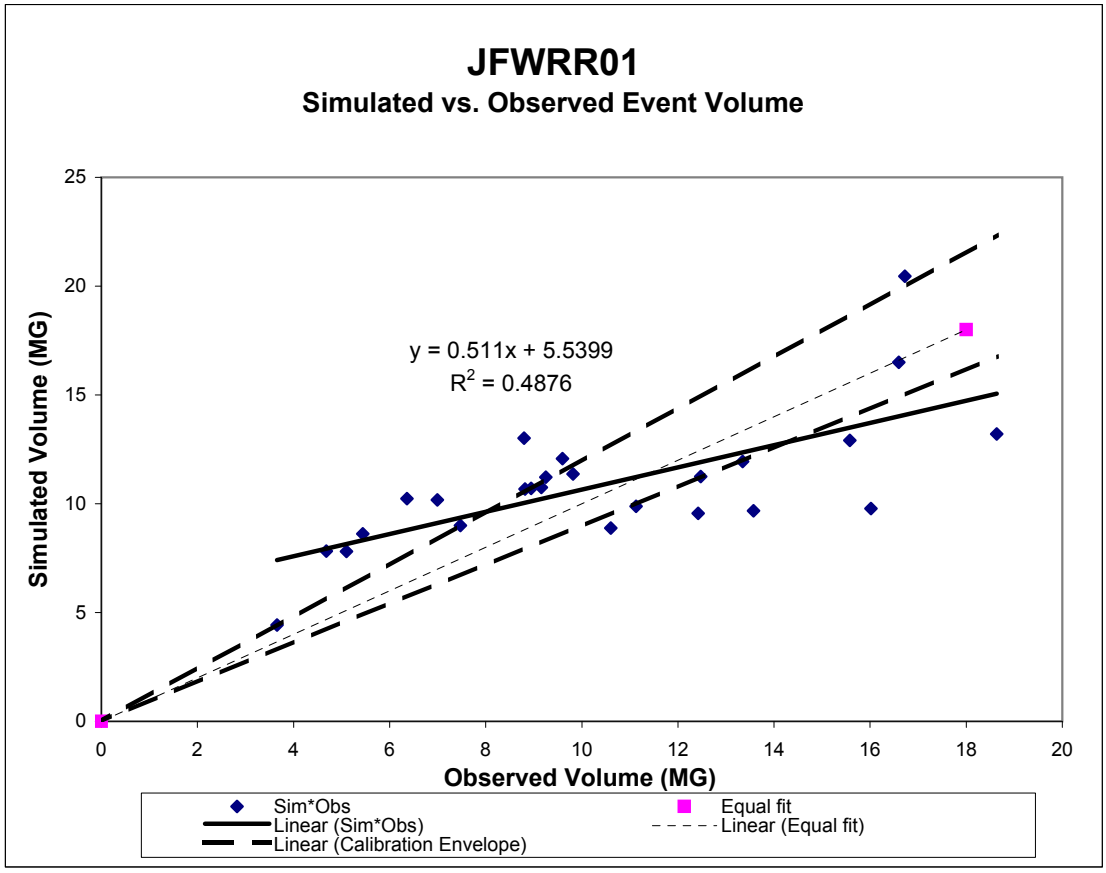

JFWR34
Simulated vs. Observed Event Peak
y = 0.5077x + 0.0849
R2 = 0.7136
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

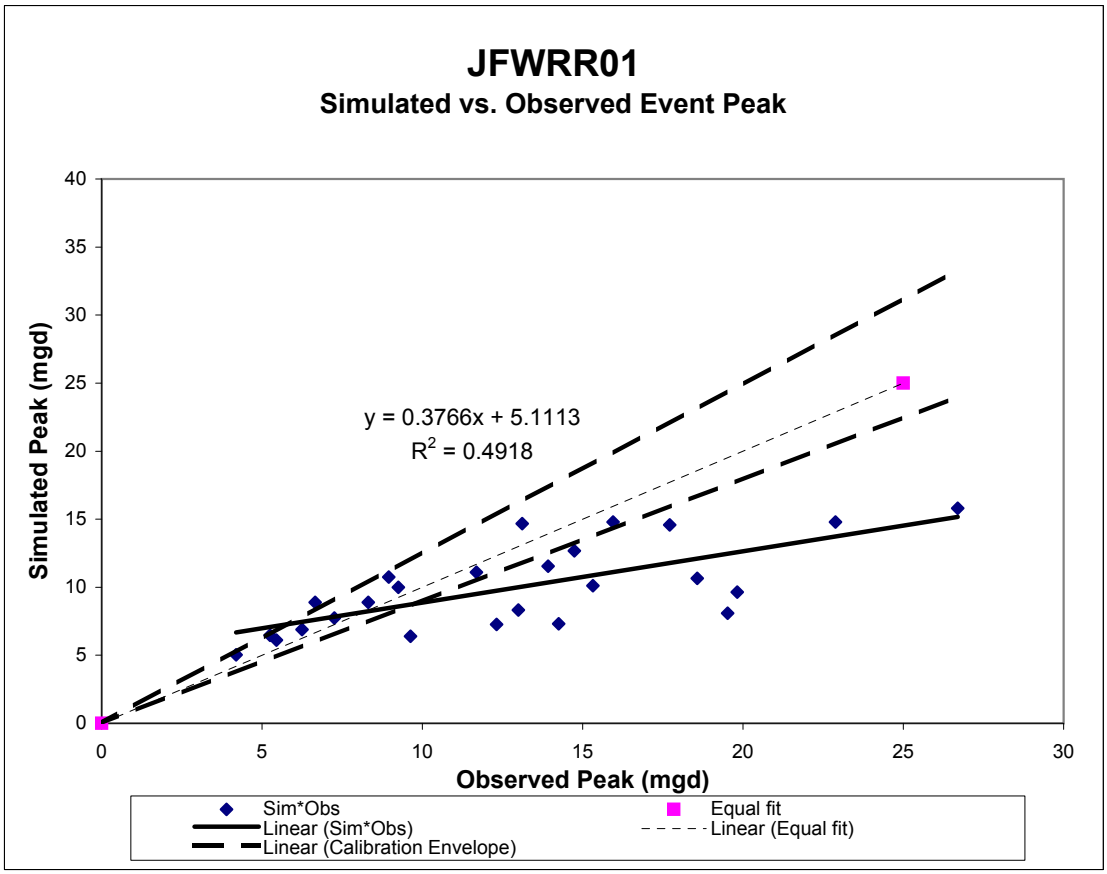
	JFWR35 10-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+0.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	0.201	0.348	73%	0.257	0.52	102%	0.174	0.286	0.112
June 1, 2006	0.080	0.133	66%	0.166	0.218	31%	0.188	0.136	-0.052
June 2, 2006	0.119	0.23	93%	0.252	0.534	112%	0.165	0.29	0.125
June 19, 2006	0.159	0.279	75%	0.166	0.338	104%	0.138	0.232	0.094
June 25, 2006	0.558	0.852	53%	1.819	1.605	-12%	0.682	0.600	-0.082
July 5, 2006	0.246	0.331	35%	0.244	0.404	66%	0.173	0.250	0.077
July 22, 2006	0.166	0.293	77%	0.199	0.370	86%	0.151	0.240	0.089
August 7, 2006	0.149	0.208	40%	0.157	0.156	-1%	0.138	0.162	0.024
September 1, 2006	0.211	0.321	52%	0.252	0.302	20%	0.177	0.220	0.043
September 5, 2006	0.198	0.282	42%	0.213	0.288	35%	0.172	0.214	0.042
September 14, 2006	0.225	0.283	26%	0.24	0.204	-15%	0.171	0.184	0.013
September 28, 2006	0.226	0.258	14%	0.257	0.236	-8%	0.190	0.194	0.004
October 5, 2006	0.264	0.295	12%	0.263	0.249	-5%	0.177	0.198	0.021
October 17, 2006	0.289	0.279	-3%	0.284	0.265	-7%	0.186	0.204	0.018
October 27, 2006	0.39	0.299	-23%	0.449	0.288	-36%	0.228	0.214	-0.014
November 7, 2006	0.45	0.301	-33%	0.474	0.348	-27%	0.24	0.235	-0.005
November 16, 2006	0.461	0.325	-30%	0.505	0.460	-9%	0.241	0.271	0.030
November 22, 2006	0.402	0.221	-45%	0.332	0.168	-49%	0.204	0.168	-0.036
December 22, 2006	0.312	0.252	-19%	0.267	0.204	-24%	0.176	0.184	0.008
January 1, 2007									
January 7, 2007									
March 1, 2007	0.465	0.251	-46%	0.458	0.240	-48%	0.229	0.195	-0.034
March 15, 2007									
April 4, 2007	0.245	0.192	-22%	0.249	0.143	-43%	0.176	0.156	-0.020
April 11, 2007	0.273	0.217	-21%	0.282	0.190	-33%	0.190	0.178	-0.012
April 14, 2007	0.673	0.434	-36%	0.58	0.441	-24%	0.259	0.264	0.005


JFWR35
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.5189x + 0.1467
R2 = 0.3279
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

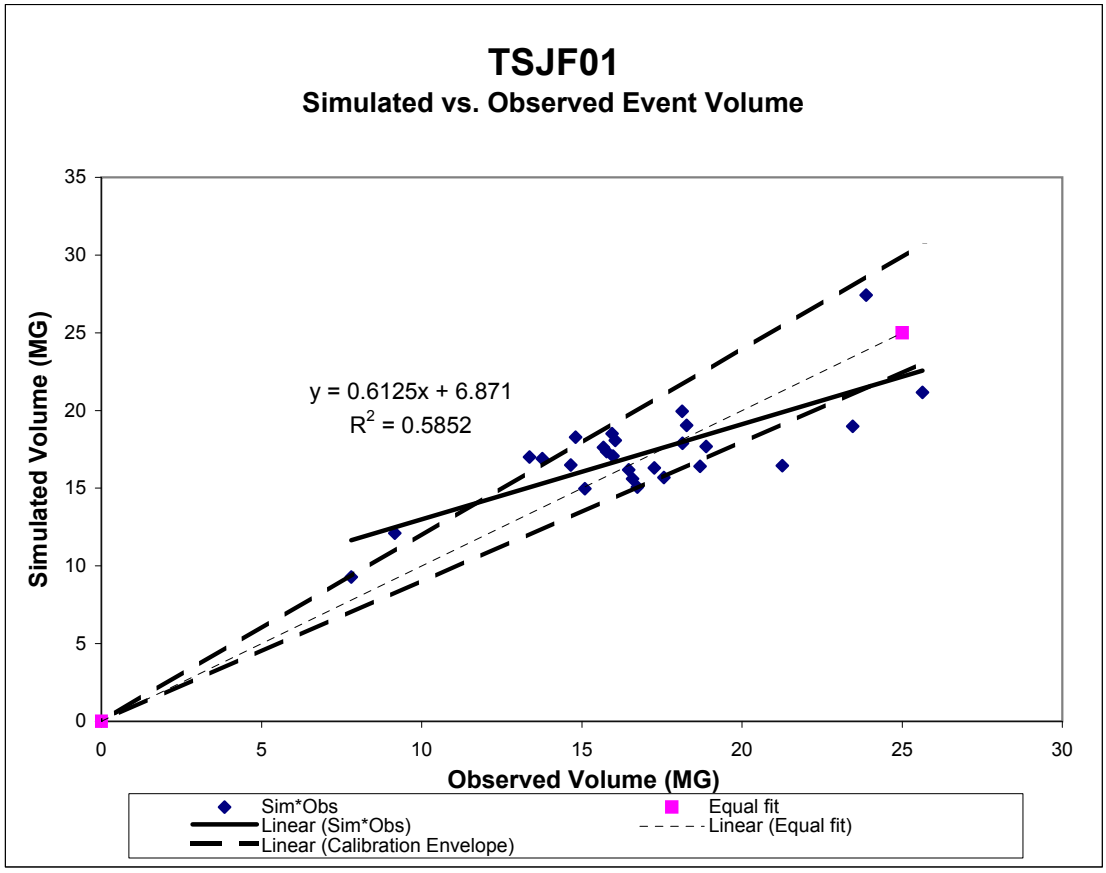

JFWR35
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.7913x + 0.0675
R2 = 0.821
0
0.5
1
1.5
2
2.5
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

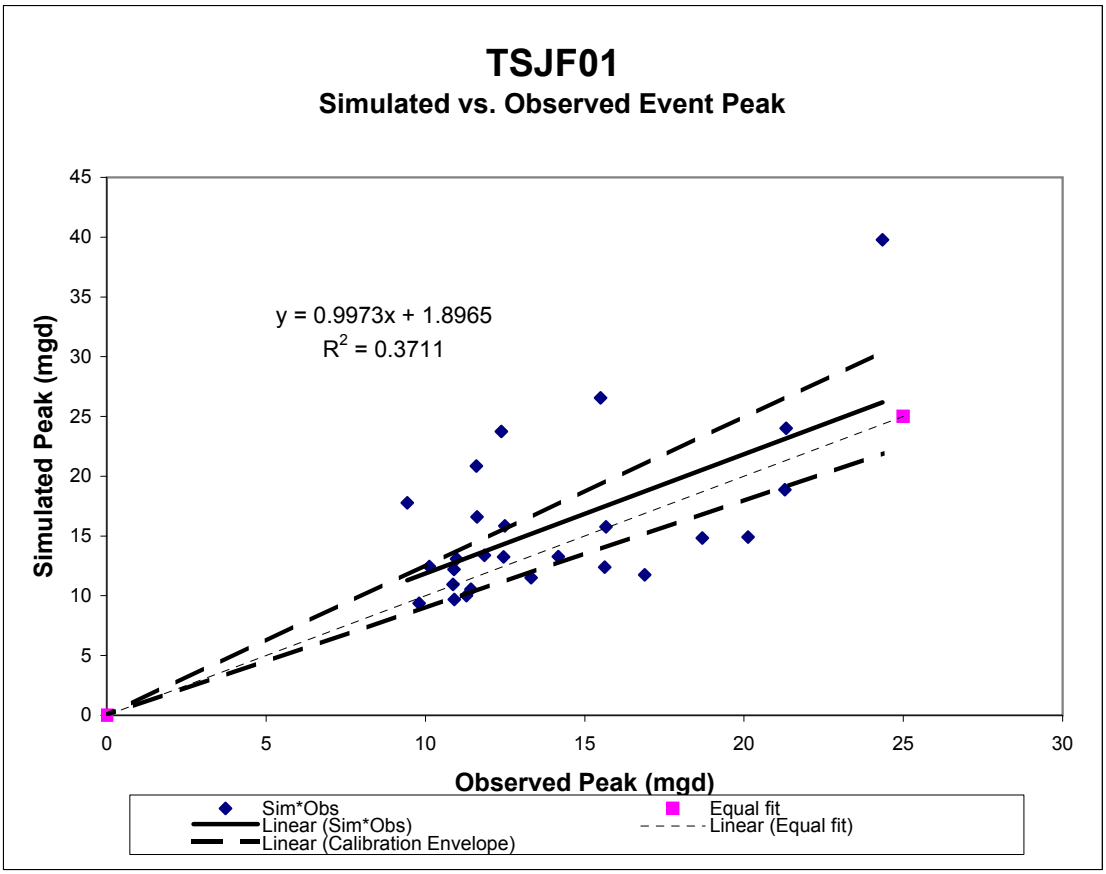
Storm Events	JFWRR01 24-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	8.8	13.021	48%	13.11	14.683	12%	2.553	3.305	0.752
June 1, 2006	3.659	4.431	21%	5.448	6.116	12%	0.697	0.941	0.244
June 2, 2006	5.104	7.802	53%	22.88	14.79	-35%	2.38	3.288	0.908
June 19, 2006	6.363	10.236	61%	13.92	11.556	-17%	1.564	1.507	-0.057
June 25, 2006	16.724	20.456	22%	26.700	15.807	-41%	12.598	12.055	-0.543
July 5, 2006	9.250	11.222	21%	11.690	11.109	-5%	2.057	2.820	0.763
July 22, 2006									
August 7, 2006	7.47	9.004	21%	6.249	6.884	10%	0.739	1.038	0.299
September 1, 2006	9.597	12.080	26%	8.949	10.738	20%	0.888	1.432	0.544
September 5, 2006	8.943	10.705	20%	9.255	9.985	8%	0.913	1.367	0.454
September 14, 2006	8.819	10.675	21%	7.256	7.746	7%	0.791	1.126	0.335
September 28, 2006	6.990	10.176	46%	6.653	8.888	34%	0.776	1.244	0.468
October 5, 2006	9.815	11.368	16%	8.318	8.895	7%	0.851	1.245	0.394
October 17, 2006	9.158	10.749	17%	19.82	9.634	-51%	2.497	1.338	-1.159
October 27, 2006	12.472	11.247	-10%	15.32	10.122	-34%	12.513	1.378	-11.135
November 7, 2006	13.349	11.938	-11%	14.74	12.685	-14%	12.419	1.604	-10.815
November 16, 2006	15.580	12.914	-17%	15.950	14.793	-7%	12.504	3.277	-9.227
November 22, 2006	10.603	8.884	-16%	9.626	6.389	-34%	0.950	0.980	0.030
December 22, 2006	11.126	9.882	-11%	14.25	7.319	-49%	2.375	1.071	-1.304
January 1, 2007	12.422	9.565	-23%	12.99	8.329	-36%	2.327	1.199	-1.128
January 7, 2007	13.572	9.678	-29%	12.32	7.259	-41%	2.337	1.066	-1.271
March 1, 2007	16.014	9.774	-39%	19.520	8.093	-59%	4.586	1.177	-3.409
March 15, 2007	18.638	13.210	-29%	18.570	10.650	-43%	6.037	1.423	-4.614
April 4, 2007	4.682	7.826	67%	4.190	5.038	20%	0.575	0.837	0.262
April 11, 2007	5.443	8.621	58%	5.248	6.456	23%	0.648	0.990	0.342
April 14, 2007	16.597	16.5	-1%	17.71	14.579	-18%	13.076	3.294	-9.782


JFWRR01
Simulated vs. Observed Event Volume
y = 0.511x + 5.5399
R2 = 0.4876
Simulated Volume (MG)
Observed Volume (MG)
0
5
10
15
20
25
0
2
4
6
8
10
12
14
16
18
20
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

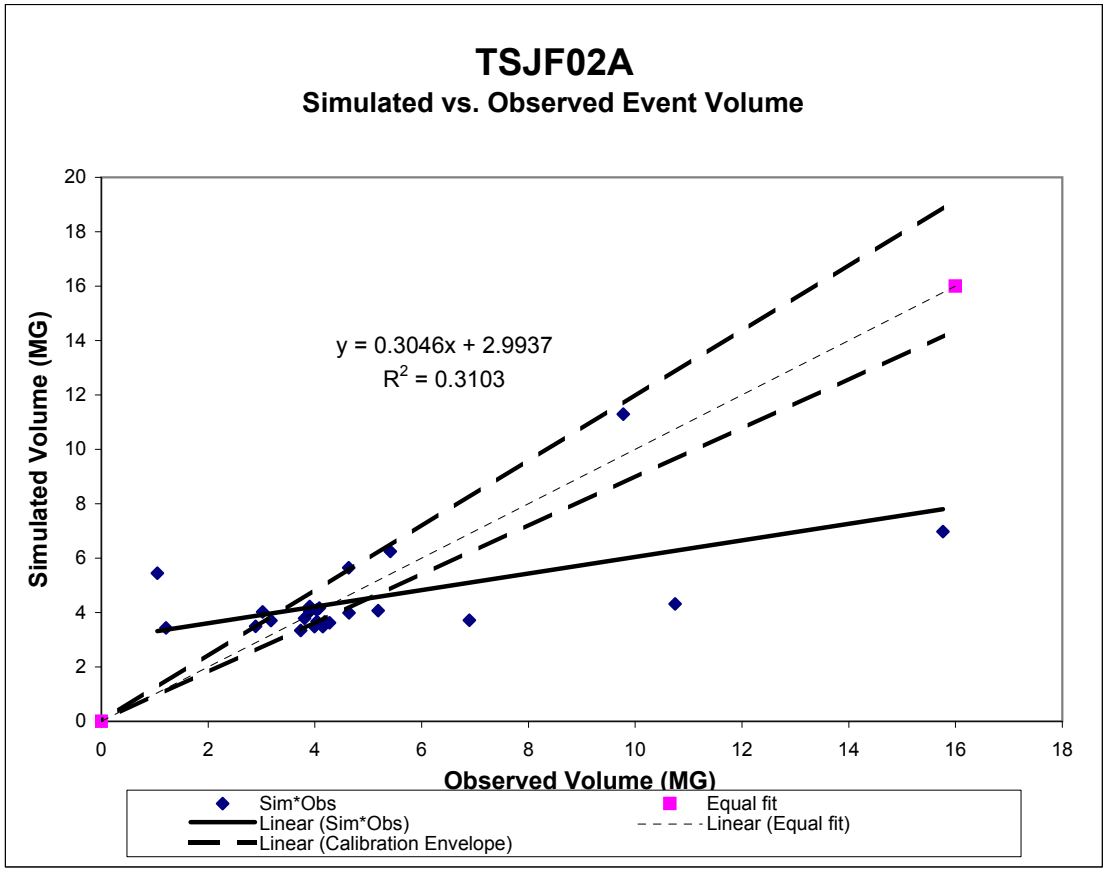

JFWRR01
Simulated vs. Observed Event Peak
y = 0.3766x + 5.1113
R2 = 0.4918
Simulated Peak (mgd)
Observed Peak (mgd)
0
5
10
15
20
25
30
35
40
0
5
10
15
20
25
30
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

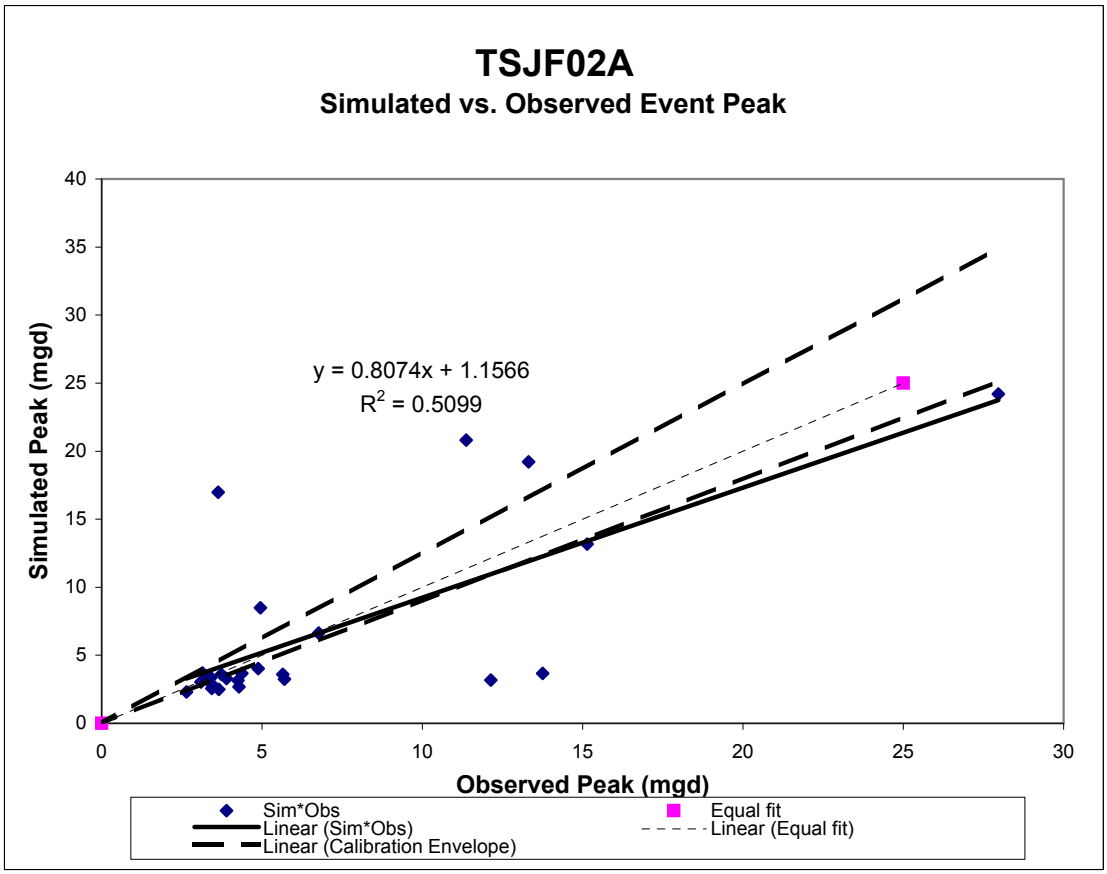
Storm Events	TSJF01 42-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	14.809	18.283	23%	11.604	20.855	80%	1.363	1.952	0.589
June 1, 2006	7.800	9.293	19%	15.664	15.759	1%	1.653	1.659	0.006
June 2, 2006	9.165	12.109	32%	15.5	26.556	71%	1.629	3.807	2.178
June 19, 2006	13.366	17.003	27%	9.428	17.773	89%	1.274	1.759	0.485
June 25, 2006	23.875	27.421	15%	24.349	39.770	63%	14.266	14.055	-0.211
July 5, 2006	18.130	19.943	10%	12.386	23.751	92%	1.528	2.141	0.613
July 22, 2006	13.769	16.903	23%	11.617	16.595	43%	1.506	1.704	0.198
August 7, 2006	15.098	14.964	-1%	9.807	9.362	-5%	1.412	1.251	-0.161
September 1, 2006	15.941	18.501	16%	14.175	13.286	-6%	1.528	1.503	-0.025
September 5, 2006	15.777	17.359	10%	12.499	15.860	27%	1.443	1.665	0.222
September 14, 2006	16.047	18.084	13%	12.456	13.24	6%	1.47	1.5	0.030
September 28, 2006	14.651	16.485	13%	10.123	12.455	23%	1.311	1.461	0.150
October 5, 2006	15.678	17.631	12%	10.980	13.097	19%	1.330	1.490	0.160
October 17, 2006	15.973	17.075	7%	11.848	13.396	13%	1.391	1.508	0.117
October 27, 2006	18.142	17.882	-1%	15.631	12.397	-21%	9.806	1.458	-8.348
November 7, 2006	18.881	17.691	-6%	18.695	14.822	-21%	11.186	1.598	-9.588
November 16, 2006	18.268	19.039	4%	21.327	24.012	13%	14.202	2.430	-11.772
November 22, 2006	17.559	15.697	-11%	11.293	9.999	-11%	1.354	1.293	-0.061
December 22, 2006	16.463	16.176	-2%	10.864	10.949	1%	1.328	1.364	0.036
January 1, 2007	17.265	16.296	-6%	10.898	12.22	12%	1.306	1.448	0.142
January 7, 2007	18.69	16.405	-12%	13.315	11.507	-14%	1.459	1.404	-0.055
March 1, 2007	21.254	16.454	-23%	16.881	11.742	-30%	1.654	1.420	-0.234
March 15, 2007	23.460	18.976	-19%	20.131	14.917	-26%	3.927	1.604	-2.323
April 4, 2007	16.730	15.061	-10%	10.908	9.679	-11%	1.294	1.271	-0.023
April 11, 2007	16.580	15.616	-6%	11.431	10.539	-8%	1.335	1.333	-0.002
April 14, 2007	25.636	21.173	-17%	21.278	18.871	-11%	11.438	1.819	-9.619


TSJF01
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.6125x + 6.871
R2 = 0.5852
0
5
10
15
20
25
30
35
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

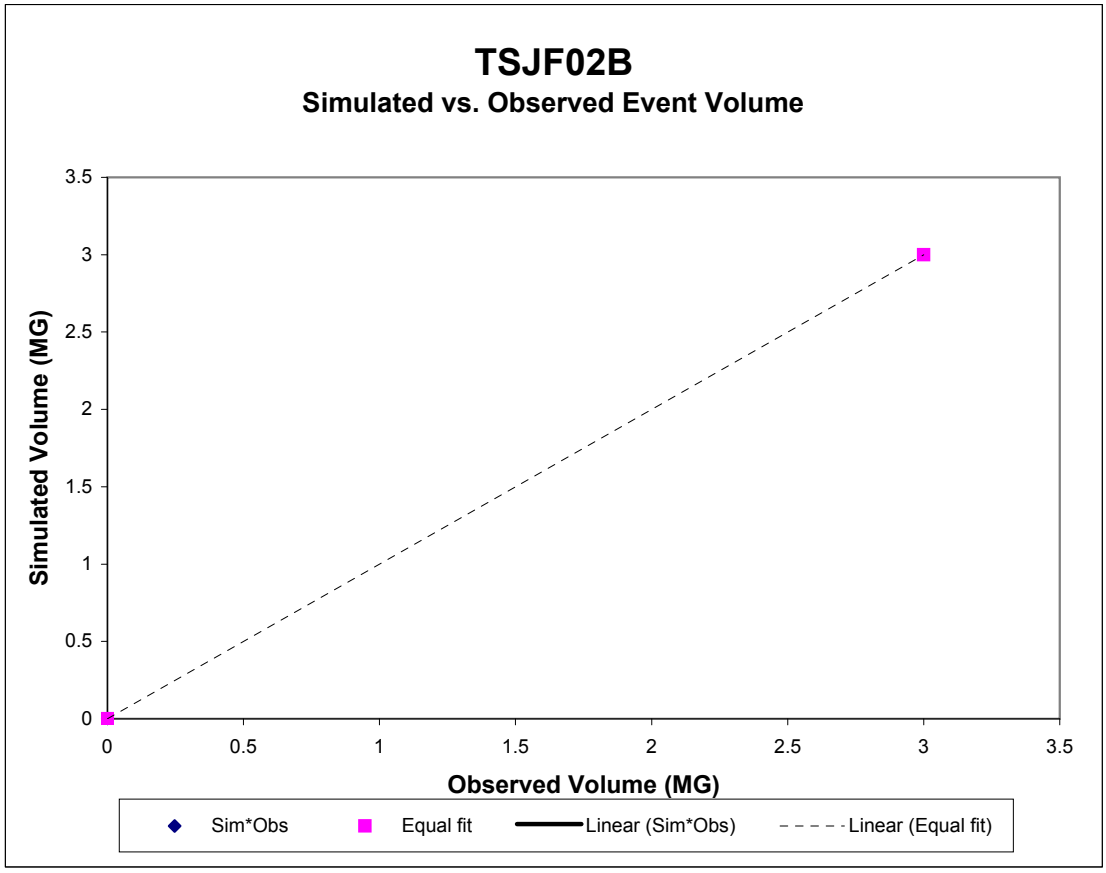

TSJF01
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.9973x + 1.8965
R2 = 0.3711
0
5
10
15
20
25
30
35
40
45
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

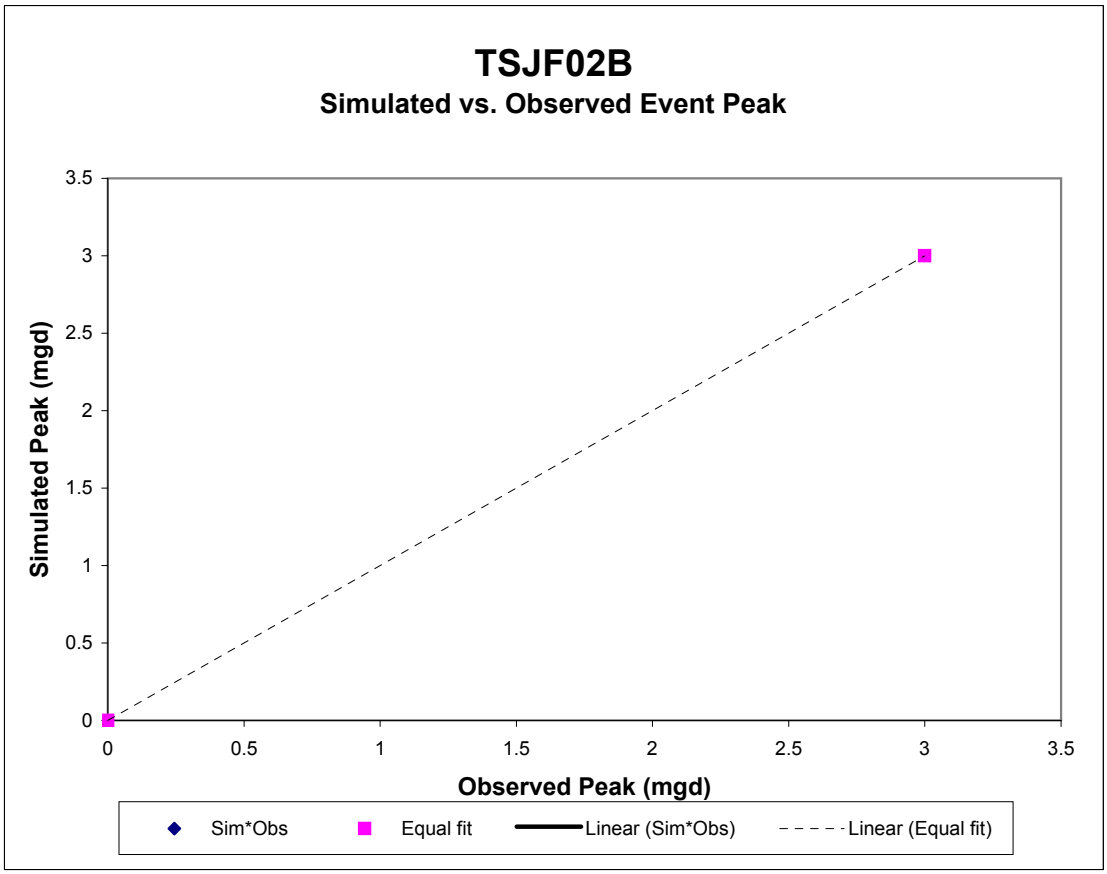
	TSJF02A 36-inch Diameter Pipe								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	1.05	5.447	419%	3.633	16.976	367%	0.984	2.242	1.258
June 1, 2006									
June 2, 2006									
June 19, 2006	1.208	3.434	184%	5.697	3.253	-43%	2.681	0.852	-1.829
June 25, 2006	9.775	11.298	16%	27.969	24.200	-13%	5.000	1.460	-3.540
July 5, 2006	4.632	5.645	22%	13.317	19.208	44%	5.996	2.579	-3.417
July 22, 2006	3.022	4.023	33%	4.955	8.486	71%	1.073	1.401	0.328
August 7, 2006	2.89	3.498	21%	3.093	3.037	-2%	0.849	0.824	-0.025
September 1, 2006	3.905	4.228	8%	3.731	3.592	-4%	0.906	0.897	-0.009
September 5, 2006	4.082	4.170	2%	6.770	6.631	-2%	1.307	1.224	-0.083
September 14, 2006	3.904	4.035	3%	4.25	3.154	-26%	0.983	0.839	-0.144
September 28, 2006	3.174	3.705	17%	3.140	3.690	18%	0.846	0.910	0.064
October 5, 2006	4.035	4.092	1%	3.405	3.363	-1%	0.870	0.867	-0.003
October 17, 2006	3.806	3.792	0%	3.888	3.3	-15%	0.961	0.859	-0.102
October 27, 2006	5.185	4.076	-21%	5.648	3.6	-36%	1.164	0.898	-0.266
November 7, 2006	4.639	3.989	-14%	4.881	4.026	-18%	1.094	0.953	-0.141
November 16, 2006	5.414	6.242	15%	11.366	20.820	83%	1.851	3.024	1.173
November 22, 2006	4.150	3.486	-16%	3.654	2.499	-32%	0.927	0.752	-0.175
December 22, 2006	4.042	3.673	-9%	4.286	2.691	-37%	1.015	0.779	-0.236
January 1, 2007	4.183	3.656	-13%	4.371	3.671	-16%	1.013	0.908	-0.105
January 7, 2007	4.275	3.627	-15%	3.465	2.8	-19%	0.879	0.794	-0.085
March 1, 2007	6.895	3.716	-46%	12.134	3.182	-74%	1.732	0.843	-0.889
March 15, 2007	10.748	4.314	-60%	13.751	3.679	-73%	1.958	0.909	-1.049
April 4, 2007	3.737	3.347	-10%	2.640	2.304	-13%	0.776	0.721	-0.055
April 11, 2007	3.995	3.480	-13%	3.431	2.570	-25%	0.893	0.762	-0.131
April 14, 2007	15.763	6.975	-56%	15.139	13.172	-13%	2.041	1.85	-0.191


TSJF02A
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
y = 0.3046x + 2.9937
R2 = 0.3103
0
2
4
6
8
10
12
14
16
18
20
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

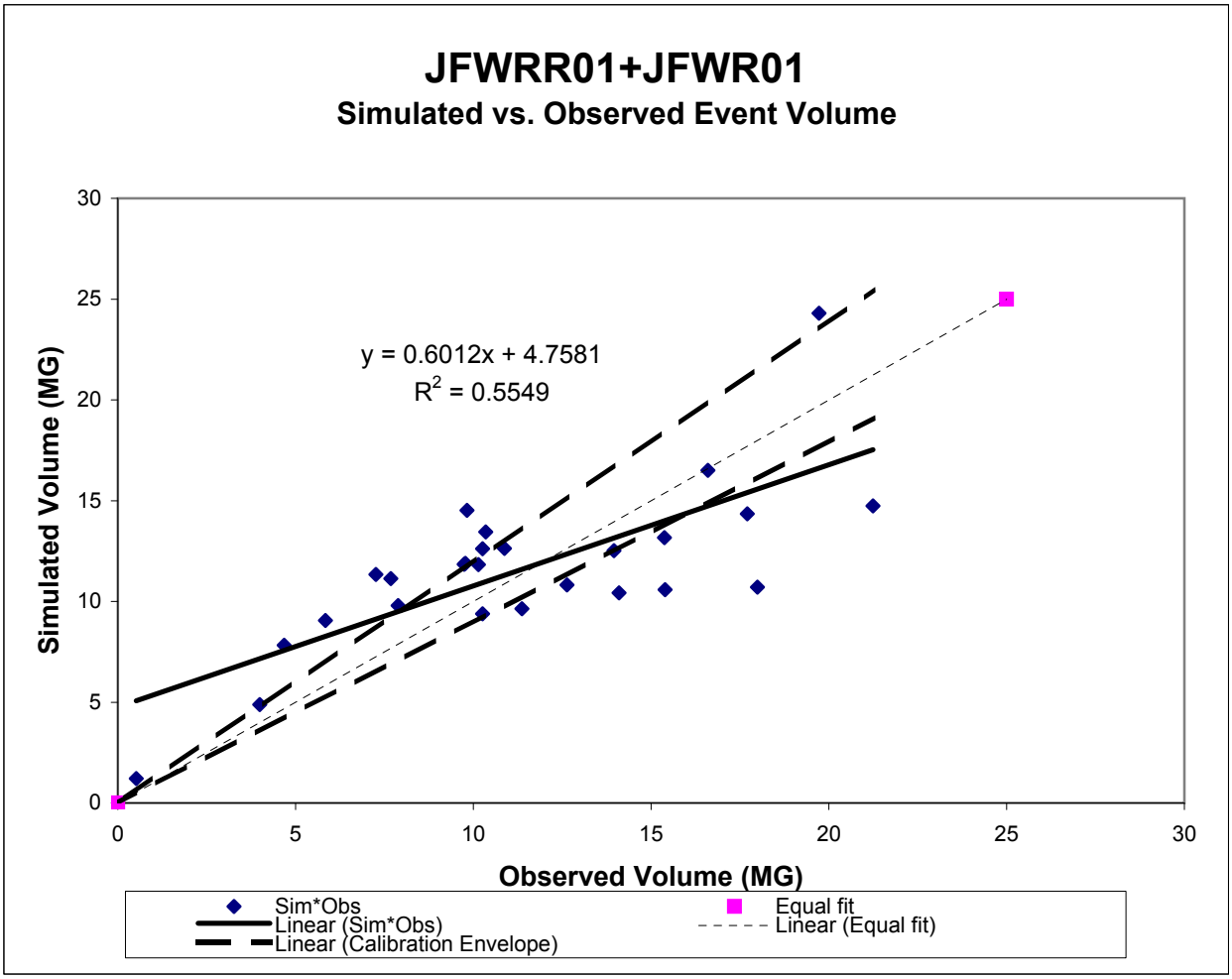

TSJF02A
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
y = 0.8074x + 1.1566
R2 = 0.5099
0
5
10
15
20
25
30
35
40
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)

Storm Events	TSJF02B 27-inch Diameter Pipe								
	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)(-0.25' to+1.5')		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006									
June 1, 2006									
June 2, 2006									
June 19, 2006									
June 25, 2006									
July 5, 2006									
July 22, 2006									
August 7, 2006									
September 1, 2006									
September 5, 2006									
September 14, 2006									
September 28, 2006									
October 5, 2006									
October 17, 2006									
October 27, 2006									
November 7, 2006									
November 16, 2006									
November 22, 2006									
December 22, 2006									
January 1, 2007									
January 7, 2007									
March 1, 2007									
March 15, 2007									
April 4, 2007									
April 11, 2007									
April 14, 2007									


TSJF02B
Simulated vs. Observed Event Volume
Simulated Volume (MG)
Observed Volume (MG)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)


TSJF02B
Simulated vs. Observed Event Peak
Simulated Peak (mgd)
Observed Peak (mgd)
0
0.5
1
1.5
2
2.5
3
3.5
Sim*Obs
Equal fit
Linear (Sim*Obs)
Linear (Equal fit)

	JFWRR01+JFWR01								
Storm Events	Volume (mg) (-10% to+20%)			Peak Flow (mgd)(-10%to+25%)			Depth (ft.)		
	Observed	Predicted	% Difference	Observed	Predicted	% Difference	Observed	Predicted	Difference
May 11, 2006	9.820	14.520	48%						
June 1, 2006	3.993	4.887	22%						
June 2, 2006	5.836	9.057	55%						
June 19, 2006	7.259	11.342	56%						
June 25, 2006	19.725	24.303	23%						
July 5, 2006	10.258	12.620	23%						
July 22, 2006	0.522	1.215	133%						
August 7, 2006	7.881	9.788	24%						
September 1, 2006	10.350	13.447	30%						
September 5, 2006	9.740	11.838	22%						
September 14, 2006	9.773	11.894	22%						
September 28, 2006	7.681	11.141	45%						
October 5, 2006	10.876	12.624	16%						
October 17, 2006	10.141	11.829	17%						
October 27, 2006	13.957	12.519	-10%						
November 7, 2006	15.376	13.169	-14%						
November 16, 2006	17.704	14.348	-19%						
November 22, 2006	11.363	9.642	-15%						
December 22, 2006	12.638	10.817	-14%						
January 1, 2007	14.101	10.432	-26%						
January 7, 2007	15.391	10.582	-31%						
March 1, 2007	17.994	10.707	-40%						
March 15, 2007	21.239	14.742	-31%						
April 4, 2007	4.682	7.826	67%						
April 11, 2007	10.260	9.381	-9%						
April 14, 2007	16.597	16.500	-1%						


JFWRR01+JFWR01
Simulated vs. Observed Event Volume
y = 0.6012x + 4.7581
R2 = 0.5549
Simulated Volume (MG)
Observed Volume (MG)
0
5
10
15
20
25
30
Sim*Obs
Linear (Sim*Obs)
Linear (Calibration Envelope)
Equal fit
Linear (Equal fit)